EFFECT OF EXCHANGE RATE DEVALUATION ON INVESTMENT IN NIGERIA

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Abstract
This study seeks to examine the effect of exchange rate devaluation on investment in Nigeria in order to find out the superior argument on whether or not exchange rate devaluation has neutral, contractionary or expansionary effect on investment. Based on this, an error correction model is employed. The error correction model is estimated using the annual time series data. From the results, investment is found to be an increasing function of exchange rate, gross domestic product, household final consumption expenditure and government final consumption expenditure. All the explanatory variables except government final consumption expenditure are statistically significant at the 5 per cent level. The significant positive impact of exchange rate on investment in Nigeria confirms the theoretical viewpoint that exchange rate devaluation has expansionary effect on investment in developing economy like Nigeria. Therefore, the study recommends a low exchange rate relative to the price of dollar in order to stimulate investment expansion in Nigeria.

Key words: Exchange rate devaluation, contractionary, expansionary, Investment, Nigeria,

JEL Codes: C51, E27, H63, H81

1.0 Introduction
For a developing country like Nigeria, the price of foreign exchange plays a highly significant role in the ability of the economy to attain optimal productive capacity. This optimal productive capacity, can be achieved through investment which means involvement of local and foreign investors in the production of goods and delivery of services. Before the dramatic change in exchange rate management policy in the wake of the economic reform programme that began in July 1986, the supply of foreign exchange to the economy was heavily subsidized through the overvaluation of the domestic currency (the naira). In the years of abundant foreign exchange earnings, for example 1974 – 1980, the impact of this subsidy was felt mainly on the consumption side. The manufacturing sector, also benefited, however, but agriculture inadvertently suffered. On the bases of this, in the face of rapidly declining foreign exchange earnings, there was every reason for the government to set the price of foreign exchange right and provide incentives for investment in the economy. Since these efforts began, the monetary authorities have had to live, very uncomfortably, with the puzzle surrounding the instability of the exchange rate.

However, there has not been general agreement among the various scholars in economics on the effect of exchange rate devaluation on investment growth. On the supply-side,

there is an indication that exchange rate devaluation has contractionary effect on investment. On the demand-side, exchange rate devaluation has expansionary effect on the investment growth. The monetarists' view suggests that exchange rate devaluation is occupied by the neutral effect on investment growth particularly on the long-run.

Some researchers have examined the effect of exchange rate devaluation on investment in Nigeria. The results of their investigation are mixed. Being that as it may, the work by Azeez, Kolopo and ajayi (2012) and Akpan (2017) reveal that exchange rate devaluation has expansionary effect on investment in Nigeria. Another studies by Adeniran, Yusuf and Adeyemi (2016) and Dada (2015) show that exchange rate devaluation has neutral effect on investment in Nigeria. The Work by Danladi and Uba (2015) indicates that exchange rate devaluation has contractionary effect on investment growth in Nigeria.

On the basis of this, one may ask, 'does exchange rate devaluation preoccupied by neutral, expansionary or contractionary effect on investment growth in Nigeria? In order to proffer solution to the raised question, relevant macroeconomic variables along with exchange rate were selected to determine this. This study is divided into five sections. The next section is literature review. Section 3 presents the methodology. Results and discussion of findings in section 4 and conclusion and policy recommendations are drawn in section 5.

2.0 Literature Review

2.1 Theoretical Review

Marshall-Lerner's Theory: Marshall and Abba P. Lerner's theory refers to a situation where an absolute sum of a country's export and imports demand elasticity is greater than one. If this is satisfied, and we assumed that a country begins with zero trade deficit and when the country's currency is devalued, it implies that its balance of trade will improve, by this the country's imports become more expensive and exports become cheaper as a result of the change in relative prices. Therefore, Marshall-Lerner's theory demonstrates that the indirect effect on the quantity of trade will exceed the direct effect of a country for the reason being that the country experiences a higher price for its imports and receives a lower price for its exports. At this stage, it is important for us to note that Marshall-Lerner's theory reveals to us the theory of price elasticity of demand of foreign trade, the analog to this idea is that if the demand facing a seller, for example, the exporting country is elastic, there is the need to reduce the price in order to increase its revenue and this is considered in this studied as it relates to devaluation and investment in the economy.

2.2 Empirical Review

Considering the work of McConnell and Brue (2005), exchange rate devaluation warrants increase in investment through a rise in net export and aggregate demand. Based on this, exchange rate devaluation can warrant increase in investment through a rise in net export and aggregate demand. If the price of naira reduces in terms of the dollar, this implies that dollar appreciates in terms of the naira. The lower value of naira and increase in dollar value enables American to purchase more naira with each dollar. Consequently, Nigeria goods becomes less expensive because fewer dollars can be used to purchase them. This enables American buyers to purchase more of Nigerian goods, hence the level of Nigerian exports increase. Put differently, Nigerian buyer can now

dispose higher quantities of naira in order to obtain a dollar. Therefore, American goods becomes more expensive because more naira can now be use to obtain American goods. This makes Nigerians to reduce their imports. The devaluation of naira causes Nigeria export to rise, if there is appropriate response through increase in the production of goods. The rise in export and a fall in imports leads to an increase in aggregate demand. The net increase in export and aggregate demand induces investment through the multiplier effect.

McConnell and Bruse (2005) state that exchange rate devaluation leads to decrease in investment through a rise in the per-unit cost of production and a decrease in aggregate supply using error correction technique. The explanation that accounts for how exchange rate devaluation leads to a decrease in investment and decrease in aggregate supply through an increase in per-unit cost of production thus: The exchange rate devaluation could alter the prices of imported resources. For instance, if the naira depreciate, our local firms will obtain less of the foreign currency by naira. This implies that the Nigeria firms is faced with higher naira price of imported resources. In other words, there exist an increase in the prices of the imported resources. The rise in price of the imported input factors warranted a rise in the per-unit cost of production at each level of output. Rising per-unit cost of production and reduction of imported foreign factor cost leads to a decrease in aggregate supply. This been the case, a reduction in aggregate supply lead to a decrease in investment growth.

The monetarists view is that exchange rate devaluation affects real magnitudes mainly through balance effect in the short-run but leaves all the real variables unchanged in the long-run (Domar,1977). This approach is based on the assumption that the purchasing power parity (PPP) holds. This predict that in the short-run an increase in the exchange rate leads to increase in investment via output and improvement in the balance of payments (BOP). The long-run monetary consequence of the devaluation ensures that the increase in investment and improvement in BOP is neutralized by the rise in prices.
Several studies have examined the effects of exchange rate devaluation on investment in many countries today. In regards, Kamin and Klau (2007) examined the effect of real exchange rate on investment output for 29 countries comprising of 7 Latin American, 6 Asian and 14 industrial countries using error correction model. Their findings show that the real exchange rates have no significant impact on investment output, implying that real exchange rate devaluation are neither contractionary nor expansionary in the long-run. The devaluation of real exchange rates is found to have contractionary effect on investment output in the short-run but the effect vanishes significantly when spurious and correlation and causation were controlled.

In another study, Conrad and Jagessar (2018) investigated the impact of exchange rate movements and exchange rate misalignments on investment for the Trinidad and Tobago economy covering the period of 1960 – 2016 using autoregressive distributed lag (ARDL) model. The results found out that bot exchange rate appreciation and misalignments have significant inverse relationship on investment in the Trinidad and Tobago economy. The results of their examination show that both the exchange rate devaluation and exchange rate appreciation have significant inverse impact on investment growth in the two countries.

Bohman-Oskooes and Kandil (2015) determined the effects of exchange rates devaluation on economic growth for a sample of MENA countries comprising of Saudi Arabia, Syria, Lebanon, Libya, Bahrain, Jordan, Kuwaite Qatar and Turnisia using co-integration and error correction approach. The results indicate that exchange rate devaluation has expansionary effect on economic for Bahrain, Saudi Arabia, Syria and Turnisia but has contractionary effect on the economic growth for Lebanon and Libya in the long-run. The exchange rate devaluation has expansionary effect on the economic growth in the short-run only. The devaluation of the exchange rate has contractionary effect on the economic in Jordan, Kuwait in the long-run.

Mwinlaaru and Ofori (2017) examined the effect of real exchange rate on economic growth in Ghana from 1984 to 2014 using autoregressive distributed lag (ARDL) approach. .The results found out that exchange rate has a significant direct relationship on the economic growth in Ghana both the short run and the long-run. They conclude that there exists the need to maintain exchange rate stability to enable acceleration and sustainable economic growth in Ghana.

Pal (2017) analyses the effect of exchange rate on real per capital GDP growth in India from the period of 1970 to 2015 using a smooth transition regression model. The results show an evidence of no-linearity in the relationship between the real exchange rate and the real per capita GDP. In addition, the results also reveal that exchange rate devaluation has negative effect on economic growth and exchange rate appreciation has positive effect on economic growth in India.

Akpan (2018) examined the relationship between exchange rate and investment growth in Nigeria from 1970 to 2015 using Ordinary Least Squares (OLS) regression technique. The annual time series data were employed during the estimation of the model. The results found out that exchange rate has a direct and significant relationship with investment growth in Nigeria.

Sibanda (2018) investigated the impact of exchange rate on investment in South Africa from 1994 to 2015 using vector error correction model. The results found out that exchange rate devaluation has significant negative impact on investment in the long-run but significant and positive impact on the short-run. Therefore, the study recommends exchange rate devaluation in order to allow increase in investment growth.

Dada and Oyeranti (2014) evaluated the impact of exchange rate on macroeconomic aggregate in Nigeria from 1970 to 2012 using vector autoregressive (VAR) model. The annual time series data were used to estimate the model. The results reveal that exchange rate has insignificant and direct relationship with investment. They conclude that exchange management policy is relevant for the attainment of investment growth in Nigeria.

Samuel and Udoh (2018) analyses the implication of currency devaluation on investment in Nigeria from the period of 2000 to 2015 using the classical linear regressive model (CLRM)/ The results found out that exchange rate has significant and direct relationship with investment in Nigeria. They concluded that the direct and positive relationship

between exchange rate and investment confirms the theoretical viewpoint that devaluation of currency increases investment growth in the developing countries.

In order to fill the gaps in the literature, this study uses the Keynesian economic theory which was mot adopted by the authors whose works were reviewed in the cause of this study as a theoretical framework of this study. According to Keynes, investment can be increase through the increase in the total expenditure. Total expenditure can be increase if one or more of its components-household final consumption expenditure, gross domestic product, investment, general government final consumption expenditure or net export is increased. An increase in net export requires an increase in foreign spending for our export, a decrease in the domestic spending for imports or both. Although, the import of foreign goods can be reduced by tariff and quotas, or even eliminated by embargo, net exports are mainly determined by the exchange rate. The devaluation of the exchange rate causes a rise in the demand for exports, since they are relatively cheap for abroad to buy. This causes a reduction in the demand for imports, since they are relatively expensive. The rise in exports (an injection) and a fall in imports (a withdrawal) will warrant a multiplier increase in investment via national income (Sloman, 2006).

3.0 Methodology

3.1 Theoretical Framework and Model Specification

On the basis of Keynes (1936), stated that increase in export goods induces investment, hence investment growth depends on domestic demand and net exports, the following specification was obtained.

$IVT = f(NEX, GDP, HCE, GCE)$ ……. (1)

Where IVT is investment, NEX represents net export, GDP is gross domestic product, HCE denotes household final consumption expenditure, GCE is the general government final consumption expenditure and f is a functional notation. In this study, equation (1) above is modified by replacing net export with exchange rate (EXR). This being the fact that exchange rate determines net export, hence it is a determinant of investment in the economy.

The error correction model (ECM) is hereby stated thus:

$$D(IVT_t) = \alpha_0 + \alpha_1 D(EXR_t) + \alpha_2 D(GDP_t) + \alpha_3 D(HCE_t) + \alpha_4 D(GCE_t) + \alpha_5 ECM_{t-1} + €_t \ldots (2)$$

Where D is the first difference operator, t is the time, α_0, α_1, α_2, α_3, α_4 and α_5 are the parameters to be estimated, ECM_{t-1} is the error correction term, $€_t$ is the equilibrium error term with zero mean and constant variance and every other variable is previously defined. The time series properties of the data are analyzed using the Augmented Dickey-Fuller (ADF) and unit root test of Dickey and Fuller (1979). The test for the co-integration was conducted using the Johansen (1988) maximum likelihood procedure. If the computed value of trace statistic and max-eigen statistic exceed critical values, one can reject the hypothesis of no co-integration and vice versa. Since equilibrium is a long run phenomenon, there is a possibility that the model may deviate from the long-run equilibrium within the given short-run period. In order to estimate such deviation, the study finds error correction mechanism appropriate.

If the coefficient of $ECMt_{-1}$ is non-zero, it shows that the model is not in equilibrium. Suppose the coefficient of ECM_{t-1} is positive, it shows that the model is diverging from equilibrium. The positive coefficient of $ECMt_{-1}$ indicates that the model will return to equilibrium but only after a long period of time. Conversely, a negative α_5 shows that the model is converging towards the equilibrium and it will be restored to equilibrium in the short period. Based on the theoretical framework of this study, the coefficients of exchange rate, gross domestic product, household final consumption expenditure, and the general final government expenditure are expected to be positive.

3.2 Data Sources

The study uses annual time series data. The time span covered is 1986 to 2018. The devaluation of the naira actually began in 1986, the year Nigeria deregulated the foreign exchange market. The data were obtained mainly from various secondary sources such as National Bureau of Statistics, Annual Report and Statement of Accounts and other documents of the Central Bank of Nigeria.

4.0 Presentation of Results and Discussion of Findings

4.1 Unit Root Tests

The unit root test was conducted by using Augmented Dickey-Fuller (ADF) test (Table 1). The variables are not stationary at level, the reason being that ADF-statistic is found less than test critical value at 5 per cent level and the p-value for each of the variable exceeds 5 per cent. At first difference, all the variables become stationary because the ADF is found greater than the critical value in absolute terms at the 5 per cent level and also the p-value of each of the variable is found less than 5 per cent. Therefore, given the ADF test, the results reveal that the variables are integrated at order one I(1) at the 5 per cent level.

Table 1 Augmented Dickey-Fuller Test for Unit Root

Variables	ADF-stat.at level	Prob*	ADF-stat.at 1st Diff.	Prob*	Order of Integration
IVT	1.7855	0.9882	-3.7782	0.0034	I(1)
EXR	0.3306	0.9481	-10. 4555	0.0000	I(1)
GDP	0.8102	0.9844	-3.3127	0.0311	I(1)
HCE	2.8202	0.9951	-6.4894	0.0022	I(1)
GCE	1.8716	0.9886	-3.2446	0.0245	I(1)

Test critical values: 1% level --3.8825
5% level --2.9973
10% level -2.6674
*Mackinnon (1966) one sided p-values
Source; Author's Computation

4.2. The Lag Order Selection Criteria

Table 2:

Lag	LR	FPE	AIC	SC	HQ
0	NA	1.5E+213	245.4931	245.7246	245.6567
1	2088355	1.344+77	241.4024	2426034*	241.7487
2	43.27668*	8.36E+79*	239.8018*	244.5688	240.67337*

* indicates lag order selected by the criterion

The lag length selection criteria such as sequential modified LR test statistic, Final prediction error (FPE), Akaike information criterion (AIC), Schwarz information criterion (SC) and Hanna-Quinn information criterion (HQ) in table 2 above were used to determine the appropriate lag length. Since the value of Final Prediction Error is 8.36E+79 given at lag 2 appears the smallest in all the values indicated by these five criteria, the error correction model is estimated at the maximum lag length of 2 based on the Final Prediction Error (FPE) test statistic

4.3. Co-integration Test

Table 3 Trace Maximum Eienvalue

Hypothesized No of CE(s)	Trace Stat.	0.05 Critical val.	Prob**	Max-Eigen Stat	0.05 Critical val.	Prob**
None*	96.0381	70.8179	0.0002	40.4264	35.8466	0.0007
At most 1*	59.5536	47.7541	0.0044	25.5425	27.5644	0.1266
	34.8702	28.8877	0.0255	18.1837	22.3315	0.2144
At most 2*	18.8733	17.5642	0.0253	11.5351	13.2554	0.1214
	5.3326	3.9537	0.0131	7.2926	4.7525	0.0233
At most 3*						
At most 4*						

*denotes the rejection of the hypothesis at the 0.05
**Mackinnon-Haug-Michelis (1999) p-values
Source: Author's Computation

The co-integration test was carried out using the Johansen test for co-integration vectors (Table 3). The trace statistic is found greater than the 0.05 critical value and p-value are less than 5 per cent for in all hypothesized numbers of the co-integrating equation. Trace test reveals 5 co-integrating equations at 5 per cent level. The max-eigen statistic is greater than 0.05 critical value and p-value is less than 5 per cent only for the first and last hypothesized number of co-integrating equations. The maximum eigenvalue test result indicates 1 co-integrating equation at 5 per cent level. Therefore, the trace and maximum eigenvalue test denote the rejection of no co-integration at the 5 per cent level.

4.4 Autocorrelation Test

The error correction model assumes that there is no autocorrelation between the error terms. The Durbin-Watson statistic is used to determine the assumption of no serial correlation. In an application, if Durbin-Watson statistic is approximately equal to 2, one can accept the hypothesis that there is no residual autocorrelation up to the specified number of lags. Therefore, the error correction model results of DIVT in Table 4 shows that Durbin-Watson statistic is 1.8812 which is approximately equal to 2.0 This result reveals that there is no autocorrelation between the error terms.

4.5 Stability Test

The Cusum test is conducted to determine whether or not the error correction model is stable. The error correction is stable if the Cusum lies within 5 per cent critical bound dotted line. From the look at the figure 1 below, the Cusum lies within 5 percent critical bound dotted lines. This indicates that the error correction model is stable at 5 percent level of significance.

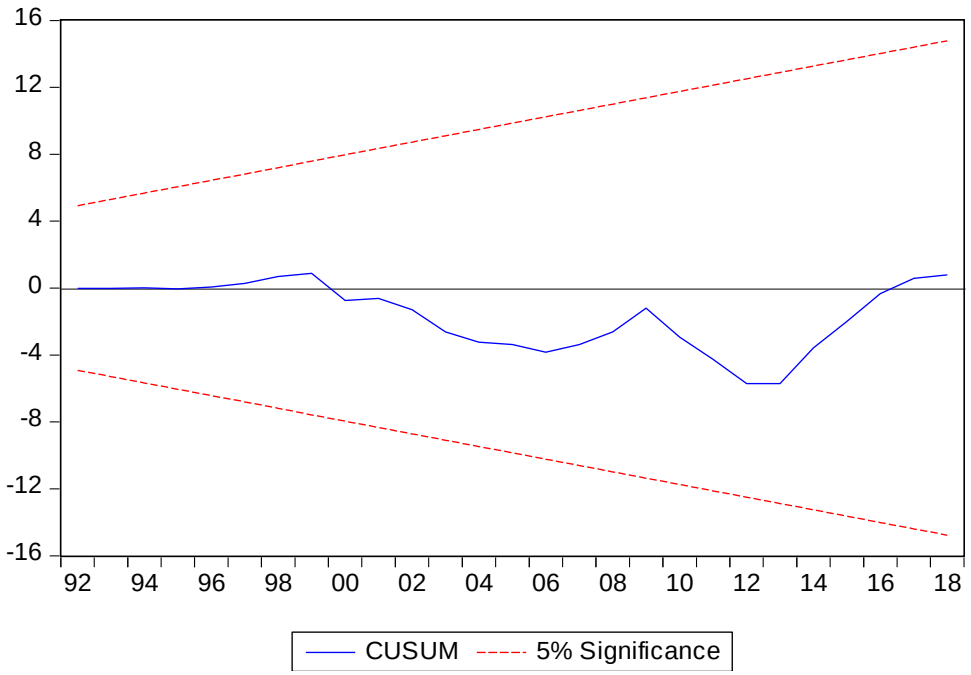

Figure1 Cusum Test

4.6 Parsimonious Error Correction Estimates of DIVT

Table 4

Variables	Coefficient	Std. Error	t-Statistic	Prob.
C	604E+13	2.44E+13	3.0232	0.0053
DEXR(-1)	6.20E+20	2.16E+13	2.5641	0.0224
DGDP	2.3307	0.4525	3.7674	0.0003
DHCE(-2)	0.4226	0.1713	2.2650	0/0316
DGCE	1.4566	0.8363	1.8825	0.0588
ecm(-1)	-0.4431	3.88E+12	-2.0671	0.0283
R-squared	0.9423			
Adj.R-ssquared	0.9314			
F-statistic	227.2712			
DW Stat.	1.8712			

Author's regression output using E-view 9

The result of goodness of fit is okay and also the value of Durbin-Watson which is 1.8712 implies that the result can be approximated to 2.0

The regression coefficients of the house hold final consumption expenditure, gross domestic product, general government final consumption expenditure and exchange rate are positive in line with the Keynesian economic theory. This indicates that investment has increased as a result of the increase in the four explanatory variables used in the model, implying that exchange rate devaluation has expansionary effect on investment in Nigeria. The regression coefficient of the ECM is negatively signed and statistically significant at 5 per cent level. The negative coefficient of the ECM is a demonstration

showing that the modern is converging towards equilibrium and it shall be restored to equilibrium at the speed of 44 per cent.

All the variables except general government final consumption expenditure are statistically significant at the 5 per cent level. These results reveal that all the variables except general government final consumption expenditure have significant positive impact on investment in Nigeria. Based on these, we therefore reject the hypothesis that exchange rate devaluation has neutral effect or has contractionary effect on investment growth and accept the hypothesis that exchange rate devaluation has expansionary effect on investment growth in Nigeria.

The regression coefficients of household final consumption expenditure, gross domestic product, government final consumption expenditure and exchange rate are 0.4226, 2.3307,1.4566 and 6.20E+20 respectively (Table 4). These results show that household final consumption expenditure contributes less than gross domestic product, and gross domestic product less than exchange rate to investment growth in Nigeria. By these results, foreign sector spending contributes more than domestic demand and businesses contribute more than household to investment growth in Nigeria.

The low contribution of household to investment growth is responsible by low level of disposable income of the household. The abysmal performance of the public sector to investment growth is also as a result of the non-performance of the government to use fiscal policy to influence economic activities particularly during depression in the economy. The high contribution of exchange rate to investment growth marks a rising dependence on the external sector to enable investment sustainability in the Nigerian economy.

5.0 Summary, Conclusion and Recommendations

The positive and significant impact of the exchange rate and other selected macroeconomic variables on investment growth in Nigeria confirm the theoretical viewpoint that exchange rate devaluation has expansionary effect on investment growth. Therefore, based on the findings of this study, the following policies become relevant:

(i) There is the need to have low exchange rate relative to the price of dollar in order to induce investment growth in Nigeria.

(ii) The disposable income of the household should be increase through expansionary fiscal means or otherwise in order to induce the household final consumption expenditure which is necessary for investment drive.

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CONFLICTS AND AGRICULTURAL PRODUCTION IN NIGERIA

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Abstract
The performance of agricultural sector is not independent of political stability and the socio-political environment where agricultural activities take place. This study assesses the Nigeria's security score cards and how they influence agriculture because of its important role in economic growth and in ensuring food security. The study covers 1984 to 2019, it employs an autoregressive distributed lag (ARDL) model. A long relationship is established between agriculture and conflicts in Nigeria. Results prove that internal conflict has no significant influence on agricultural production in Nigeria. However, while rise in ethnic tensions will cause reduction in long-run food production, rise in religious tensions causes short-run loss of food production. Therefore, these findings suggest that a sustained national security challenge poses a great threat to agriculture. Self-sufficiency of each geopolitical zone in agriculture is therefore recommended. Most importantly, it is recommended that farmers' environment be fully protected and there should be communal mitigation against insecurity.

Keywords: Agricultural production; conflicts; food security; Nigeria; ARDL.

JEL Codes: C22, Q18, F52.

1.0 Introduction

Agricultural production determines the availability of food, therefore, it plays an important role in ensuring/achieving food security (Foods and Agriculture Organization [FAO], 2021; Liefert et al., 2019; Pawlak & Kołodziejczak, 2020; Sasson, 2012). However, the ability of agriculture to ensure food security is not independent of political stability and the socio-political environment where agricultural activities take place. This is because the important elements of agriculture, such as labour, large farm size, storage facilities and markets are subject to political stability (Amaza et al., 2006; Clover, 2003; Otsuka, 2013). The Nigeria's security challenges have been sustained for a while (See Nwozor et al., 2019). An assessment of the agricultural production is necessary at this time because of the protracted geopolitical crises and sustained political conflicts Nigeria has witnessed in the last decade. It is important to show how this affects agriculture because of the role this sector plays in determining the quality of life. Furthermore, value added agriculture, which involves the transformation of raw agriculture products into more valuable end products, is key in Nigeria's economic growth. Agriculture, therefore, forms a major component of the country's GDP.

Where there is unrest, economic activity is likely to be paralyzed and trade flow interrupted because farmers, traders and other residents tend to abandon their farmlands for safety. Consequently, farm sizes will shrink as weeds take over since they are not

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cultivated for a period. Due to the barriers to free flow of transportation amidst social conflicts, it becomes riskier to transport goods and services in regions affected by terrorism. The consequence is increased cost of transportation or disruption of food flows to other parts of the country (Bandyopadhyay & Sandler, 2014; Liefert & Liefert, 2015). In developing countries, farmers often have little access to good storage facilities, hence such products do not get to its intermediate form or the markets when there is crisis, many of them perish during protracted uncertainty. Since not all parts of the country are self-sufficient in the production of all food types due to differences in climatic conditions and soil type, this causes the poor distribution of agricultural products and shortage of some items in some parts of the country (Hlophe-Ginindza & Mpandeli, 2020; Liefert & Liefert, 2015). The major consequence will be food price hike which is among the symptoms of food crises (Clover, 2003; Sasson, 2012). Food production shocks are also inevitable where food supply is being used as a weapon of war, farms and farmers become the targets of terrorists (Applebaum, 2004). Such is the Nigeria case as farmlands and farmers are being attacked (Nwozor et al., 2019).

This study is unique because it identifies the role of different socio-political conflicts in agricultural production. It assesses the impact of each type of conflict on agriculture through an auto regressive distributed lag (ARDL) model. Through this, policy measures of government can be tailored towards addressing the specific security challenges to food production. It points direct attention to the need for direct defense policies that enhance the protection of farmers. Furthermore, just as Helland and Sørbø (2014) linked food insecurity to poverty, such that food security is extremely low where poverty is prevalent, this situation often hatches up to mitigate political stability. This is because of the tendency of hunger to nurture accumulated grievances, become a platform for mobilizing terrorist agents and further promote political unrest. In other words, effort to ensure food security in Nigeria is also a step towards combating the national insecurity challenges and poverty. The option of continuous importation of food to meet domestic needs may not be too beneficial to Nigeria because of the negative effects on external variables. Therefore, it is necessary to determine the role of conflicts in agriculture. The link between agriculture and conflicts provides an insight into the most effective economic and security policy interventions which could be harnessed to sustain the contribution of agriculture to economic growth.

The rest of this paper is organized as follows. A review of related literature is presented in the next section. This is followed by description of the methodology employed in Section 3 while results and discussion of findings are presented in Section 4. The study concludes with Section 5.

2.0 Literature Review

Following the relative deprivation theory, Gurr (1970) opined that a rising sense of economic and social deprivation could result to discontentment, frustration and aggression, which eventually, lead to violence. Gurr (1968) associated terrorism with poverty and income inequality. Shahbaz (2013) also developed the "Have and Have-not hypothesis" which explains that social conflicts tend to yield to the individual's perceived chances of survival amidst the economic conditions which may or may not provide them access to the basic needs for survival. This idea suggests that lack of basic elements for survival such as food, could spark violence. On the other hand, Yusuf and Mohd (2022)

conceptualized that destruction of land and human resources due to recurring conflicts results in contraction of economic growth and the benefits of economic prosperity, such as employment, food security, equity, etc. Sustainable economic growth and production expansion can, therefore, be attained when there is peace and serenity (Mazumdar & Bhattacharjee, 2019; Yusuf, & Mohd, 2022). National security issues are critical for national economic stability and vice versa.

This section analyses the evidence of direct and indirect effects of social conflicts on agriculture in existing literature. Pawlak and Kołodziejczak (2020) has identified the crucial role of the agricultural sector in providing food security among 100 developing countries. Having classified the countries into different groups, using Ward's agglomerative hierarchical clustering method, a comparative analysis of the typological groups of countries showed that countries where there are conditions militating against agricultural production and those with high share of agriculture in their GDP tend to have larger food security challenges. In Russia, Liefert et al. (2019) found that agricultural import ban due to geopolitical conflict and economic crises affect consumers negatively. The comparative analysis of various food prices between 2010 and 2016 showed that Russia's imports of agricultural and food products reduced substantially due to the Ruble depreciation and this, consequently, raised food prices, thus, lowering food consumption. Although, these data collection evidence from Russia shows that this pushed up food prices between 2014 and 2016, but does not cripple food availability because domestic agricultural production had to increase sequel to import ban in food importation (Liefert et al., 2019, see also Liefert & Liefert, 2015). In this case food insecurity was addressed and stimulated by their ability to increase food production almost immediately. Apart from economic factors, Clover (2003) observed that internal, social and political factors challenge the ability to address food security in Africa.

Geopolitical events were established as part of the direct causes of food production shocks which spilled over from one food sector to other sectors. (Cottrell et al., 2019). Cottrell et al. (2019) assessed the 53-year time series of global food production from crop, livestock, aquaculture and fisheries sectors with the aid of Vector Error Correction Model (VECM). With the same technique of VECM, data from Nigeria between 1960 and 1970 provided evidence that insurgence negatively impacted food production and government expenditure in agriculture, despite the positive effects of government expenditure on agriculture recorded within same period (Solomon et al., 2019).

With the aid of information gathered through questionnaire analysed by simple percentage, qualitative interviews, direct observation and elicitation, both qualitative and quantitative analysis reported from the field study by Awodola and Oboshi (2015) showed that, in the northern part of Nigeria, terrorism severely affects the agricultural sector. Nwozor et al. (2019) also explored primary data drawn from interviews, in addition to the secondary data obtained from both the Nigerian government and international non-governmental and intergovernmental organizations. Information related to national insecurity and food production were analysed in figures. This quantitative analysis showed that that food production would be impossible to achieve if insecurity is sustained in farming communities. Ndubueze-Ogaraku et al. (2017) assessed another security challenged state in the southern part of Nigeria. They opined that these shocks have led to low farm productivity and higher food prices. Anwana et al. (2019)

considered Nigeria's agriculture value added using an Auto Regressive Distributed Lag (ARDL) bound testing procedure. It was shown that the security level has significant positive impact on agriculture value added both in the short and long run. Conversely, Buhaug et al. (2015) used data spanning over 50 years for Sub-Saharan Africa and found a weak relationship between agricultural output and violent conflict. Their result suggests that political violence is weak and inconsistent in driving food production shocks in this region even though it has social consequences.

The literature may have assessed the roles of security issues in agricultural production, however these assessments, especially in Africa has been subject to data availability, hence they are yet to be explicitly addressed. This study differs from these studies as it assesses each type of conflict and tensions in Nigeria and how each affects agriculture.

3.0 Methodology

3.1 Data

The study explores annual time series data for Nigeria from 1984 to 2019. The Nigeria's security challenges may not be over yet, the decision on length of data was strictly due to data availability. However, the period that Nigeria has experienced some major challenges in its state security are well reflected within this this time frame. Political instability became severe in the mid-1980s, the early 2000s were quite stable but crises began in 2009 when a brief unrest was lunched by the terrorist sect known as Boko Haram and Nigeria has not had a long period of rest from social conflicts since then.

For this study, agricultural production proxied by value added agriculture is the dependent variable, it is denoted as AGRIC. Data were computed as the net output of the agriculture sector given as a percentage of the total GDP for each year. These were obtained from the World Bank's World development indicators[3].

There are three sets of indices serving as proxies for insecurity. First, internal conflict denoted as INT is measured of as the sum of Civil War/Coup Threat, Terrorism/Political Violence, and Civil Disorder. Each of these sub components has a maximum score of 4 points assigned to the lowest risk level, while 0 is assigned to the highest risk level. This implies that the internal conflict ranges from 0 to 12 whereby figures will be close to 12 in periods of least internal conflicts and close to 0 in periods of highest internal conflict. Second, ethnic tension denoted as ETH is measured by risk levels related to racial, nationality, or language differences. The highest rating for this category is 6 which indicates minimum tensions. Periods characterized by the high racial and nationality tensions have scores closer to zero. Third, religious tensions denoted as REL are also measured in points ranging from 0 to 6, such that the points get closer to 0 when there are high levels of social and political activities that suppress of religious freedom. (See Howell, 2013). These indices have been obtained from the Political Risk Services PRS Group reports dataset on International Country Risk Guide.

Due to the nature of agriculture which requires multiple inputs, it is necessary to include factor inputs as part of the determinants of production in agriculture, therefore the roles of labour in agriculture denoted as LA and fertilizer use indicated as FERT are also

considered. The labour employed in agriculture calculated as a percentage of total employment were also obtained from World Bank Data Bank while data on fertilizers were obtained from Foods and Agriculture Organization of the United Nations[4]. Fertilizer is total annual nutrient nitrogen measured in tonnes.

Econometric Modelling via ARDL Bound Testing Approach

The model agricultural production in Nigeria is specified as a function of internal conflict, ethnic tension, religious tensions, land and fertilizer. The equation is as follows:

$$AGRIC = f(ETH, INT, REL, FERT, LA) \quad (1)$$

This implies that agriculture is regressed on arrays of independent variables. AGRIC, FERT, and LA have been transformed into their natural logarithms indicated by ln to help stabilize variance and interpret the estimation in elasticities as shown below:

$$lnAGRIC = \beta_0 + \beta_1 INT + \beta_2 ETH + \beta_3 REL + \beta_4 lnLA + \beta_5 lnFERT + \mu \quad (2)$$

Where β_0 represents the intercept, β_i represents the coefficients of respective dependent variables and μ represents the error term, which has a zero mean.

The model in Equation (2) is transformed based on the ARDL approach to obtain

$$\begin{aligned}\Delta lnAGRIC_t = {} & \beta_0 + \beta_1 lnAGRIC_{t-1} + \beta_2 INT_{t-1} + \beta_3 ETH_{t-1} + \beta_4 REL_{t-1} \\ & + \beta_5 lnLA_{t-1} + \beta_6 lnFERT_{t-1} + \sum_{i-0}^{p^1} \delta_7 \, \Delta lnAGRIC_{t-1} + \sum_{i-0}^{q^2} \delta_8 \, \Delta INT_{t-1} \\ & + \sum_{i-0}^{q^3} \delta_9 \, \Delta ETH_{t-1} + \sum_{i-0}^{q^4} \delta_{10} \, \Delta REL_{t-1} + \sum_{i-0}^{q^5} \delta_{11} \, \Delta lnLA_{t-1} \\ & + \sum_{i-0}^{q^6} \delta_{12} \, \Delta lnFERT_{t-1} + \theta ECM_{t-1} + \mu_t \end{aligned} \quad (3)$$

where, Δ indicates the differencing in the variables, that is $\Delta y_t = y_t - y_{t-1}$. An autoregressive distributed lag (ARDL) model advanced by Pesaran et al. (2001) is then applied to Equation (3) to obtain the long-run and short-run effects of the independent variables on agriculture. The ARDL bound testing cointegration approach provides evidence on the long-run cointegrating relationship which may exist among the variables. Unlike the existing cointegrating models, the ARDL bounds testing approach is suitable irrespective of whether the variables are integrated of I(1), or I(0) or mutually cointegrated. Another advantage of this approach is its flexibility over small or large sample size.

The first part of equation (3) is the long run equation, when estimated, it is expected that $\beta_2 > 0$, $\beta_3 > 0$ $\beta_4 > 0$ since the indices indicate relatively peaceful conditions by higher figures. It is also expect that β_4 and β_5 will be positive because more inputs will normally mean increased production. The same a-priori expectations apply to the second part of the equation which is the short-run of the model.

The dynamic short-run effects are estimated through a restricted error correction model, derived from the second part of the flexible ARDL model expressed as follows:

$$\Delta lnAGRIC_t = \beta_0 + \sum_{i-0}^{p^1} \delta_i \, \Delta lnAGRIC_{t-1} + \sum_{i-0}^{q^2} \delta_i \, \Delta INT_{t-1} + \sum_{i-0}^{q^3} \delta_i \, \Delta ETH_{t-1} + \sum_{i-0}^{q^4} \delta_i \, \Delta REL_{t-1} + \sum_{i-0}^{q^5} \delta_i \, \Delta lnLA_{t-1} + \sum_{i-0}^{q^6} \delta_i \, \Delta lnFERT_{t-1} + \theta ECM_{t-1} + \mu_t \quad (4)$$

θECM_{t-1} indicates the first lag of the error correction term obtained from the residual of the long run effects in Equation (2). The dependent variable, agriculture might not immediately adjust to its long-term equilibrium path as the determinants change, the speed of adjustment to the long-run equilibrium path is therefore captured by the ECM_{t-1}term. This is defined as the one period lag of the residual in the long-run equation. The long-run coefficients are normalized as follows: $\theta_i = \beta_i / (1 - \sum_{j=1}^{q} \omega_k)$, where $i = 1,2,3,4,5$, and error correction term (ECM) is obtained as:

$ECM_{t-1} = \theta_1 lnAGRIC_{t-1} + \theta_2 INT_{t-1} + \theta_3 ETH_{t-1} + \theta_4 REL_{t-1} + \theta_5 lnLA_{t-1} + \theta_6 lnFERT_{t-1}$ (5).

4.0 Presentation of Results and Discussion

4.1 Pretests of variables

This section begins with the graphical presentation of data as shown in Figure 1 while the statistical properties of data and pretests on these variables are presented in tables 1-3.

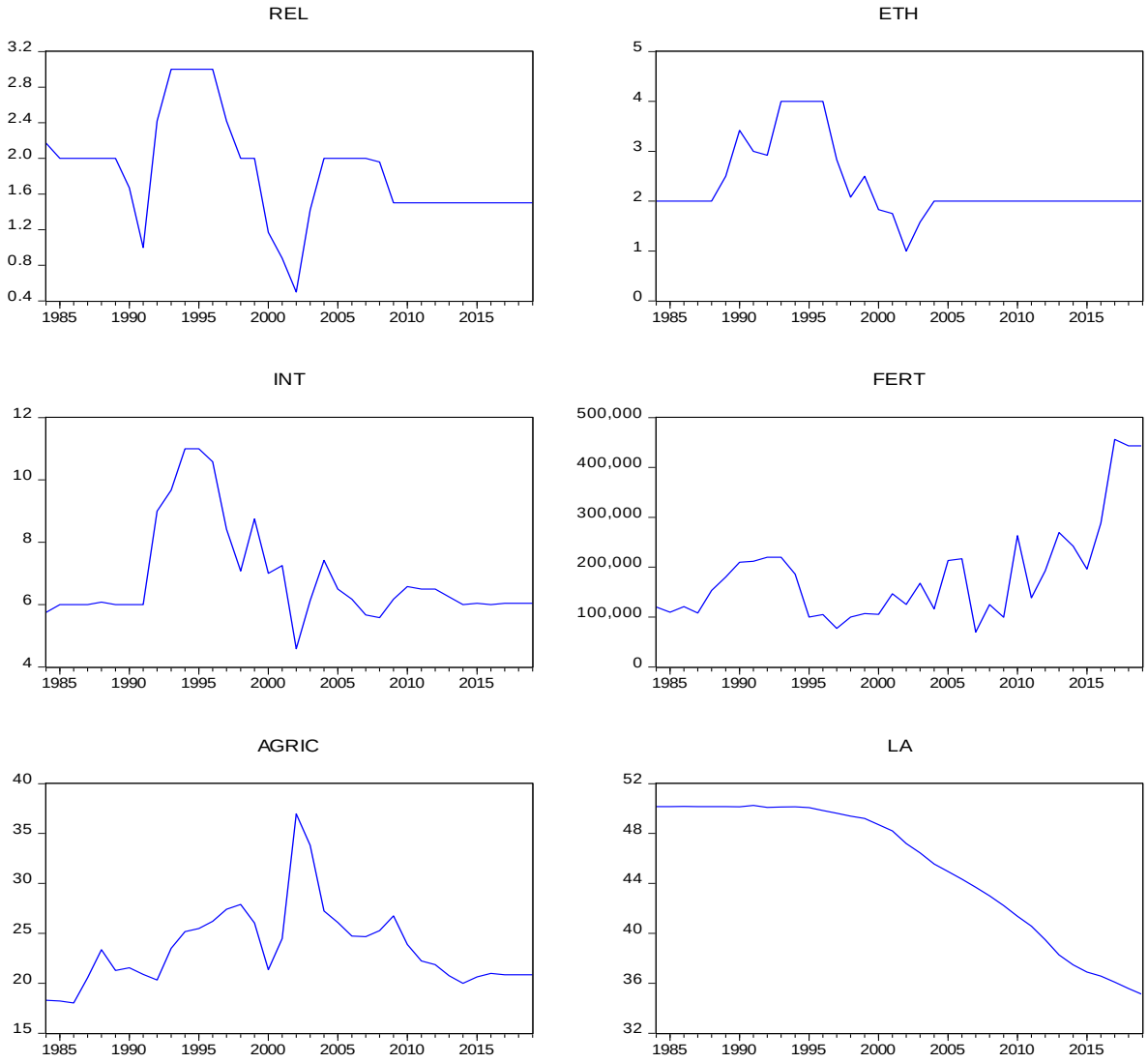

Figure 1. Time plots of data. REL is religious tension, ETH is ethnic tension, INT is internal conflict, AGRIC is agricultural production, FERT is fertilizer and LA is labor in agriculture.

Table 1. Descriptive Statistics

	AGRIC	ETH	INT	REL	FERT	LA
Mean	23.5690	2.3169	6.8831	1.8364	184720.2000	45.3205
Median	22.8032	2.0000	6.1500	1.9800	160489.0000	47.6945
Maximum	36.9651	4.0000	11.0000	3.0000	456277.5000	50.2460
Minimum	18.0204	1.0000	4.5800	0.5000	70115.0000	35.0980
Std. Dev.	4.0173	0.7311	1.5869	0.5808	98863.3700	5.3678

Skewness	1.3465	1.2926	1.4783	0.3177	1.4631	-0.6702
Kurtosis	5.3767	3.8747	4.1838	3.2196	4.7148	1.9236
Jarque-Bera	19.3511***	11.1717***	15.2150***	0.6781	17.2548***	4.4331
Probability	0.0001	0.0038	0.0005	0.7124	0.0002	0.1090

Source: Author's Computation using E-Views

Table 1 is a presentation of the statistics that describe the data. This shows that distribution of data is positively skewed except labor in agriculture. The kurtosis figures of data on agriculture, internal conflict and fertilizer are not near normal distribution. The Jarque-Berra statistics also rejects the null of normality for all the variables except religious tensions and fertilizer. The standard deviation values show that ethnic tension has the highest volatility among the proxies for insecurity in Nigeria, while religious tension is the least volatile. The mean values suggest that most prominent source of tension in Nigeria is religious tension because it has the least mean value which indicates it is the highest source of crises among the three.

We check for stationarity properties of variables through the Zivolt-Andrew, augmented Dickey–Fuller (ADF) and the Phillips–Perron (PP) unit root tests. Unlike the ADF and PP tests which assume structural stability and linear adjustment, the Zivot–Andrews unit test provides information about single structural break point in each of the series. Zivot and Andrews (1992) employed three regression equations to test a null hypothesis that there is a unit root against the alternative of no unit root. Table 2A and Table 2B present the unit root tests.

Table 2A. Conventional unit root tests.

Philip Peron

At Level

		AGRIC	ETH	INT	REL	LA	FERT
With Constant	t-Statistic	-2.4142	-1.8803	-2.0087	-2.1506	2.1723	-0.9380
	Prob.	*0.1453*	*0.3373*	*0.2819*	*0.2272*	*0.9999*	*0.7639*
With Constant & Trend	t-Statistic	-2.0602	-2.1281	-2.2550	-2.3673	-1.9571	-1.9784
	Prob.	*0.5491*	*0.5129*	*0.4462*	*0.3892*	*0.6036*	*0.5924*
Without Constant & Trend	t-Statistic	0.0240	-0.4994	-0.3514	-0.9080	-2.7619	0.9832
	Prob.	*0.6837*	*0.4927*	*0.5510*	*0.3160*	*0.0072*	*0.9105*
At First Difference							
With Constant	t-Statistic	-5.9756***	-5.4424***	-6.0071***	-4.7907***	-1.5956	-7.6083***
	Prob.	*0.0000*	*0.0001*	*0.0000*	*0.0005*	*0.4739*	*0.0000*

With Constant & Trend	t-Statistic	-7.9945***	-5.3881***	-5.9792***	-4.7066***	-2.0060	-8.6886***
	Prob.	*0.0000*	*0.0005*	*0.0001*	*0.0032*	*0.5773*	*0.0000*
Without Constant & Trend	t-Statistic	-6.1089***	-5.5299***	-6.1010***	-4.8705***	-0.6222	-7.4646***
	Prob.	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.4404*	*0.0000*
ADF							
At Level							
		AGRIC	ETH	INT	REL	LA	FERT
With Constant	t-Statistic	-1.9654	-1.7140	-2.0087	-2.6801*	-0.0047	-1.1654
	Prob.	*0.2999*	*0.4157*	*0.2819*	*0.0879*	*0.9517*	*0.6782*
With Constant & Trend	t-Statistic	-1.8295	-2.0595	-2.2332	-3.0916	-2.3371	-1.9784
	Prob.	*0.6674*	*0.5495*	*0.4575*	*0.1244*	*0.4040*	*0.5924*
Without Constant & Trend	t-Statistic	-0.0077	-0.5005	-0.3842	-0.8826	-1.5647	0.2340
	Prob.	*0.6729*	*0.4922*	*0.5385*	*0.3267*	*0.1092*	*0.7483*
At First Difference							
With Constant	t-Statistic	-6.7004***	-5.4522***	-6.0058***	-4.8582***	-1.6982	-7.4157***
	Prob.	*0.0000*	*0.0001*	*0.0000*	*0.0004*	*0.4231*	*0.0000*
With Constant & Trend	t-Statistic	-6.9848***	-5.4005***	-5.9635***	-4.7829***	-1.9056	-4.3517***
	Prob.	*0.0000*	*0.0005*	*0.0001*	*0.0027*	*0.6297*	*0.0083*
Without Constant & Trend	t-Statistic	-6.7995***	-5.5367***	-6.0990***	-4.9293***	-0.7585	-7.3094***
	Prob.	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.3803*	*0.0000*

Notes: (*) Significant at the 10% and (***) Significant at the 1%.

Table 2B. Zivolt- Andrews unit root tests.

Zivot-Andrews Unit Root Test
At Level

		AGRIC	ETH	INT	REL	LA	FERT
With Constant	t-Statistic	-2.8548*	-3.6606***	-3.7807**	-4.0536**	-2.9502**	-3.5418**
	Prob.	0.0513	0.0000	0.0253	0.0376	0.0497	0.0131
	Chosen breakpoint	*1993*	1997	1992	2000	1993	1995
With Trend	t-Statistic	*-4.4506****	-2.4574	-3.0984**	-3.2530**	-3.7895**	-4.2222***
	Prob.	*0.000*	0.778518	0.049812	0.032626	0.013505	0.001586
	Chosen breakpoint	*2003*	1991	1993	1993	1999	2012
With Constant & Trend	t-Statistic	-5.4382**	-5.8107***	-4.4445***	-4.0790**	-3.5318*	-4.3746*
	Prob.	0.0131	0.0000	0.0001	0.0347	0.0801	0.0560
	Chosen breakpoint	*2002*	1997	1997	2000	1993	2007

Notes: (*) Significant at the 10%; (**) Significant at the 5%; and (***) Significant at the 1%. Source: Author's Computation using E-Views

With the conventional unit root tests, the stationarity of variables at level cannot be ascertained except after their first difference. Labor in agriculture is not stationary at all using these methods. However, testing the stationarity of variables with the Zivolt-Andrews method which accounts for structural breaks, we have evidence that the variables are all stationary at level. These pretests provide the direction in the choice of cointegration test technique. The cointegration test among variables is based on the bounds testing approach proposed F-test by Pesaran et al. (2001). It tests the null hypothesis H_0 that $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$ against the alternative H_1 that $\beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 = 0$.

Table 3: Bounds test cointegration.
Null Hypothesis: No cointegration

	F-Bounds Test				
Test Statistics	5.560562				
	Significance level	10%	5%	2.5%	1%
	I(0)	2.750	3.120	3.490	3.930
	I(1)	3.790	4.250	4.670	5.230

The cointegration test result in Table 3 shows that the null hypotheses of no cointegration among the variables can be rejected at 1 percent level of significance. This implies that there are level relationships among the variables in the long run.

4.2 Empirical Results and Discussion

Having concluded the necessary pretests on variables, the long run and short run estimation output from the ARDL model is estimated and results are shown in Table 4. For brevity of space, the significant and relevant coefficients are presented.

Table 4: Short- and long-run ARDL coefficients.

Dependent Variable: AGRIC (1, 4, 1, 4, 4, 3)				
Short-run equation				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	84.1617*	37.6941	2.2328	0.0561
AGRIC(-1)*	-0.6365**	0.2092	-3.0420	0.0160
ETH(-1)	6.4605	3.5537	1.8180	0.1066
INT(-1)	-1.1876	1.1621	-1.0219	0.3368
FERT(-1)	-0.0001**	0.0000	-2.8983	0.0199
D(ETH)	0.4986	2.1051	0.2368	0.8187
D(ETH(-3))	2.4737	2.0060	1.2332	0.2525
D(REL)	0.9573	3.1234	0.3065	0.7671
D(REL(-1))	11.8050**	4.0722	2.8989	0.0199
D(REL(-2))	15.1978**	3.4594	4.3932	0.0023
D(REL(-3))	6.6430*	3.0488	2.1789	0.0610
D(LA)	5.6612	3.6891	1.5346	0.1634
D(LA(-2))	13.1632**	4.3886	2.9994	0.0171
D(LA(-3))	11.0820**	4.4049	2.5158	0.0360
D(FERT)	0.0000**	0.0000	-3.5819	0.0072
Long run equation				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
ETH	10.1506*	5.3998	1.8798	0.0969
INT	-1.8658	1.6002	-1.1660	0.2772
REL	-28.8804**	10.8583	-2.6597	0.0288
LA	-0.8356	1.1266	-0.7417	0.4795
FERT	-0.0002**	0.0001	-2.5851	0.0324

Notes: (*) Significant at the 10% and (**) Significant at the 5%. Source: Author's Computation using E-Views

The results show that the previous value of agriculture has significant negative impact on its present value. Agricultural production is highly and significantly influenced by religious tensions as this is shown in the significant positive coefficients. Since the security indices are measured in reverse, such that the higher the level of serenity, the higher the values, this result implies that food production increases by about 11.81%, 15.2% and 6.64% when Nigeria's score card on religious tensions increases by 1 unit in the previous year, penultimate and antepenultimate respectively. The ethnic tension index has positive but weak impact on production in agriculture. This implies that that when the country is relatively free from ethnic tension, increase in agricultural production may not be significant, and when there is increase in ethnic tensions, it will not have significant adverse effect on food production in the short run. The relationship of internal conflict index with agricultural production is negative but also not significant. We find a significant positive impact of labor on production in agriculture, but we do not find evidence that fertilizer use has any contribution to this production. This might be due to increased farming techniques which are likely to cause decline in the use of fertilizers. In the long-run, both ethnic tensions and religious tensions are significant. However, agricultural production is likely to increase by 10.15% when there is an increase in ethnic tranquility by 1 unit. This study suggests that the major insecurity threats to agriculture in Nigeria are both ethnic tensions and religious tensions. While ethnic tension threatens short-run food production, religious tension is a threat to agricultural production in the long run. Furthermore, the role of labour in agriculture is positive in the short-run. This further suggests that as insecurity directly affects farmers, reduction in labour supply as a result of this, will reduce value added agriculture.

5.0 Summary, Conclusion and recommendations

This study assessed the Nigeria's security score cards and how they affect the Millennium Development Goal of achieving food security. Analyzing this through the essential agricultural sector, the ARDL technique was employed for an empirical assessment of the various relationships between agricultural production and the security challenges in Nigeria, namely ethnic tensions, internal conflict and religious tensions. Results proved that internal conflicts have no significant influence on agricultural production in Nigeria. However, rise in ethnic tensions will cause reduction in long-run agricultural production, while rise in religious tensions causes both short-run and long-run production loss. The implication of these is that shocks to agricultural production in such periods will threaten food supply, its distribution and availability, consequently, this will distort food prices thereby causing food insecurity. This also has implication for the GDP which is significantly fed by the agricultural sector, therefore, Nigeria's economy will suffer a setback if conflicts persists. Furthermore, the goal to increase Nigeria's export base through this sector cannot be easily actualized if it becomes difficult to meet the domestic needs.

This study suggests that conscious efforts be made to ensure a peaceful Nigeria which is free from religious and ethnic tensions. This is because the higher the scorecards of Nigeria on both religious and ethnic tensions, the higher the level of food production. It is important to protect farmers' environment and mitigate the attack of terrorists and bandits by watching out for their rural societies because they play direct and significant role in food production. Food security in itself is a necessary precondition for national security, if the problem of hunger is mostly solved, there is a tendency that conflicts and

crises will subside. It is also recommended that each geopolitical zone be self-sufficient in their agriculture such that most regions can produce more variety of foods than they are already producing. This can be achieved when each state adopts agricultural policies that support local and peasant farmers. Such as investing in and improving regional infrastructure in agriculture, technology and storage facilities. The option of importing agricultural products to meet the domestic needs is not sustainable because of the adverse effects on external variables. The impact of Nigeria's security challenge on importation of agricultural commodities was not considered in this study. This path and its potential impact on agricultural export are hereby left for future research.

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THE INFLUENCE OF EXCHANGE RATE FLUCTUATION ON ECONOMIC GROWTH IN NIGERIA

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Abstract
The study examines the influence of exchange rate fluctuation on economic growth in Nigeria for a period of 38 years (1983 to 2020). The E-GARCH model was employed to generate the volatility while the ordinary least square (OLS) was used in the analysis. The results from the empirical analysis showed that the trend in exchange rate movement have been more rapid since around 1985 when marked movements in the market began to be noticed. The volatility increased after 2000 and culminated in the deep sections seen between 2016 and 2019. Apparently, exchange rate fluctuation in the Nigerian economy has continued since then, although with a lower amplitude. Generally, the results from the OLS indicate that all the variables such as INTR, EXRT and INFL in the model do not have any significant impact on economic growth in Nigeria. The study recommends among others that, the government should control and regulate the exchange rate in the country in order to boost trading activities and returns in the Nigerian stock market. Also, the importance of exchange rate volatility should be taken into account. Hence, the Nigerian government and regulators should try to either prevent or reduce the level of volatility in the market. They should also try to prevent a currency crisis by expanding the stock market and putting all necessary legal and regulatory framework in place to attract capital inflow from outside the country either in form of foreign direct investment or foreign portfolio investment in order to deepen and broadening the market and thus stimulating the growth and development of the Nigerian industrial sector.

Keywords: Exchange Rate, E-GARCH, Economic Growth, Fluctuation

JEL Codes: C22, C51, E27, H63

Introduction
The economic growth as a proxy of Gross Domestic Product (GDP) is one of the primary indicators used to gauge the health of a country's economy. It represents the total dollar value of all goods and services produced over a specific time period looking at the size of the economy (Nwite, 2014). Ogosi, Andem, Nkanor and Zibigha (2022) described economic growth as a persistent increase in per capita national output or net national product over a lengthy period of time. It's also the year-over-year increase in the monetary worth of an economy's aggregate production. Economic growth is quantified

as a percentage change in Gross National Product (GNP) or Gross Domestic Product (GDP), which is a core macroeconomic policy goal for any country in the world (Nyoni & Bonga, 2018).

Nigeria economic performance since independence in 1960 has been decidedly mediocre. Despite the availability and expenditure colossal amount of foreign exchange derive mainly from its oil and gas resources, economic growth has been weak and the incidences of poverty has increased (Ismaila, 2016). The objective of every independent nation like Nigeria is to improve the standard of living of its citizenry and promote economic growth and development of the country but due to vicious circle of poverty, scarcity of resources and the law of comparative advantage, countries depend on each other to foster economic growth and achieve sustainable economic development where exchange rate played an important role as the price of one currency in terms of another (Mordi, 2006).

Abdu, Umar, Mohammed and Ajannah (2021) disclosed that exchange rate is the price of one country's currency expressed in terms of some other currency. It determines the relative prices of domestic and foreign goods, as well as the strength of external sector participation in the international trade. Adegboyo (2019) opined that in Nigeria the issue of exchange rate management came into being in September 1986 when the flexible exchange rate regime was put in place following the government adoption of the Structural Adjustment Programme (SAP). The objectives of exchange rate policy under SAP were: to preserve the value of Naira, maintaining external and internal balance as well as achieving the macroeconomic goals. Since the adoption of exchange rate deregulation, the value of Naira has been fluctuating and the government has been formulating different policies to ensure that the Naira is stable. Sanusi (2004), noted that maintaining a stable exchange rate for the Naira is very sacrosanct, given the structure of the economy, and the need to minimize distortions in production and consumption, increase the inflow of non-oil export receipts and attract foreign direct investment. Having identified exchange rate as an important variable that ensure both internal and external balances as well as economic growth. Chang and Tan, 2008) say that a sound and appropriate exchange rate policy is very crucial condition for improving economic growth.

Exchange rate fluctuation is the risk associated with unexpected movements in the exchange rate (Adeniyi & Olasunkanmi, 2019). Economic fundamentals such as the inflation rate and interest rate, which have become more volatile in the 1980s and early 1990s, by themselves, are sources of exchange rate. Volatility of exchange rate induces uncertainty and risk in investment decision with destabilizing impact on the macroeconomic performance (Mahmood & Ahmed, 2011). In view of this, it has been recognized in previous studies that maintaining a relatively stable exchange rate is important in boosting economic growth.

Some of the prior studies on the influence of exchange rate fluctuation on economic growth in Nigeria are the work of Abdu, Umar, Mohammed and Ajannah (2021); Adeniyi and Olasunkanmi (2019); Amassoma and Odeniyi (2016) among others. Previous empirical studies like Abdu, Umar, Mohammed and Ajannah (2021) found a positive and significant relationship between exchange rate fluctuation and economic growth.

On the other hand, Adeniyi and Olasunkanmi (2019); Amassoma and Odeniyi (2016) found that exchange rate fluctuation negatively and insignificantly influence economic growth. The existence of these inconsistencies in the finding of the previous studies establishes a gap in knowledge that needed to be filled. Hence, this study is an attempt to fill this gap by empirically investigating the influence of exchange rate fluctuation on economic growth in Nigeria. This study seeks to provide answers to the following research questions;

- What is the relationship between exchange rate and economic growth in Nigeria?
- What is the impact of interest rate on economic growth in Nigeria?
- What is the relationship between inflation rate and economic growth in Nigeria?

The broad objective of this study is to examine the relationship between exchange rate fluctuation and economic growth in Nigeria. The specific objectives are to;

- Examine the relationship between exchange rate and economic growth in Nigeria.
- Determine the relationship between interest rate and economic growth in Nigeria.
- Determine the relationship between inflation rate and economic growth in Nigeria.

In the light of the above discussion, the study examines the influence of exchange rate fluctuation on economic growth in Nigeria.

The results of this study would contribute to improvement and understanding how exchange rate fluctuation affects economic growth in Nigeria. The policy makers in the industrial business will find the study useful as a benchmark of policy formulation, which can be effectively implemented for better and easier regulation of the industrial sector. The government will use the study so as to come up with policies and ways of promoting stability in the country. Government agencies such as Nigeria Stock Exchange and policy makers will find this as a useful basis that can guide them in decision making process especially when formulating policies such as fixing the interest rates and legislations that govern industrial sector. The research finding will remain important to industrial sector stakeholders, finance students', researchers', academicians and scholars, finance professionals, government agencies and policy makers. The study will be practically useful to the industrial sector shareholders as they will be aware whether treasury top management tasked with value addition of their investments are making viable decisions. To academicians, scholars and researchers, this study will open up to a new area that has not been studied hence arouse curiosity in trying to dig deeper in this field especially for those who may be interested in conducting further research on this area will undoubtedly find this study to be significant point of reference for literature and research gaps.

2.0 Literature Review

Conceptual Review

Salami, Apelogun, Omidiya and Ojoye (2015:95) described economic growth as the sustained increase in per capita national output or net national product over a long period of time. Salami, Apelogun, Omidiya and Ojoye (2015:95) buttress that economic growth occurs when a nation's production possibility frontier shifts outward, in other words, it means an increase in the value of goods and services produced by a country over a period.

Aigbokhan (1995) defined economic growth as an increase in the average rate of output produce per person usually measured on a per annum basic. It is also the rate of change in national output or income in a given period. Economic growth is the increase of per capital gross domestic product (GDP) or other measure of aggregate income. It is often measured as the rate of change in real GDP (Ismaila & Imoughele, 2015). Odo, Eze and Onyeisi (2016) opined that economic growth is the increase in the amount of goods and services produced by an economy over a period of time. It is conventionally measured as the percentage rate of increase in real gross domestic product, or real GDP. Economic growth can be measured as a percentage change in the Gross Domestic Product (GDP) or Gross National Product (GNP).

Exchange rate is the price of one country's currency expressed in terms of some other currency (Abdu, Umar, Mohammed & Ajannah, 2021). It determines the relative prices of domestic and foreign goods, as well as the strength of external sector participation in the international trade (Abdu, Umar, Mohammed & Ajannah, 2021).

Adeniyi and Olasunkanmi (2019) opined that exchange rate indicates the values of two currencies in terms of another. It is the price of one currency in terms of another currency. Traditionally, exchange rate is defined as the price of one unit of the foreign currency in terms of the domestic currency (Mejekomi, 2000). It is a determinant of relative prices of domestic and foreign goods and also determines the strength of external sector participation in the international trade. Exchange rate remains a veritable tool in the growth of an economy as its stability is very germane in stimulating export and private investment. Evan and Lyons (2005) described exchange rate is an important economic indicator that has a strategic role in an economy and say that exchange rate movements widely influence various aspects of the economy, including inflation, import-export performance which in turn affects the output of economy. He concludes that in the market, there are two main forces that interact with each other, namely supply and demand and they form an equilibrium which is reflected in the price and quantity levels where supply and demand curves meet.

Money as a store of value and medium of exchange creates different types of claims. Essentially, those who lend money, expect to be compensated for handing over their liquidity for a stated period of time to users of money (Obim, John & Orok, 2018). This compensation constitutes interest rates, which is often expressed as a rate per cent per annum (Nzotta, 2004). Thus, interest represents payments made by an individual, a firm or organization for money used or borrowed (Obim, John & Orok, 2018). It also constitutes the price for a loan or a measure of the percentage rate at which the current value of a debt grows over time, to equal the future payments. However, managing risk is an important function for business organizations dealing with money, which includes banks and non-bank institutions, thus, connoting the need for interest rate.

According to Utile, Okwori and Ikpambese (2018), interest rates are the costs a borrower has to pay when obtaining a loan in any economy. This definition implies that, interest rates are the determinants of the cost of credits in an economy. The impact of high cost of interest rates in the society is not unconnected to the fact that borrowers may hesitate to borrow when they should. This may be because the cost of credit and the credit itself may aggregate to an amount that may be unaffordable to the borrower to pay back within

the stipulated due date of the loan. The implication of this on the economy is that GDP of the economy would be low since equity financing alone cannot adequately sponsor the production activities in an economy.

Anidiobu, Okolie and Oleka (2018) described inflation as a recurrent rise in the overall level of prices for goods and services. It is measured as an annual percentage increase. As inflation rises, every naira one owns buys one a smaller percentage of a good or service. The value of a naira does not remain constant during inflation. The value of a naira is measured in terms of purchasing power, which is the real, tangible goods that money can buy. When inflation rises, there is usually a decline in the purchasing power of money.

Earlier, Umaru and Zubairu (2012) defined inflation as a persistence rise in the general price level of broad spectrum of goods and services in a country over a long period of time. Inflation has been intrinsically linked to money, as captured by the often heard maxim "inflation is too much money chasing too few goods". Singh (2018) lament that inflation affects economics in various positive and negative ways. The negative effects of inflation include an increase in the opportunity cost of holding money, uncertainty over future inflation which may discourage investment and saving. Positive effects include reducing the real burden of public and private debt, keeping nominal interest rates above zero so that central banks can adjust interest rates to stabilize the economy and reducing unemployment due to nominal wage rigidity.

Empirical Review

Exchange Rate Fluctuation and Economic Growth

Abdu, Umar, Mohammed and Ajannah (2021) examined the effect of exchange rate on economic growth from 1986 to 2019 using secondary data sourced from Central Bank of Nigeria Statistical Bulletin of various issues. From 1986 being the year the monetary authority shifted from fixed exchange rate regime to flexible exchange rate regime to 2019. The regression analysis using ordinary least square was used to analyze the data. The result revealed that exchange rate has significant positive effect on economic growth while interest rate and inflation rate have significant negative effect on economic growth. Adeniyi and Olasunkanmi (2019) examined the impact of exchange rate volatility on economic growth in Nigeria. The study made use of ARDL co integration and Error Correction Model to capture the stated objective. The results revealed that there is existence of co integration among the variables. The findings also exhibited significant impact of export on Gross Domestic Product while import is insignificant both in the short and the long run. The study established insignificant positive relationship between exchange rate volatility and economic growth in Nigeria.

Amassoma and Odeniyi (2016) centered on the nexus between exchange rate variation and economic growth in Nigeria with emphasis to the purchasing power of the average Nigerians and the level of international transaction. Exchange rate fluctuations have been of serious concern to the monetary authorities, policy makers and business tycoons of developing countries, Nigeria inclusive because of the relevance of exchange rate in international trade, investment and in determining the level of output growth of a country. Therefore it is vital to examine the degree at which exchange rate fluctuates which had called for a lot of attention in Nigeria. This study examined the Impact of Exchange Rate

Fluctuation on the Nigerian Economic Growth using an annual data of forty-three (43) years covering the period (1970 – 2013). The standard deviation method was employed to capture and estimate the fluctuation inherent in the model as regards the research's objective. The study employed econometric techniques such as; Multiple Regression Model, Augmented Dickey Fuller (ADF) test, Johansen Cointegration test and the Error Correction Model (ECM). Evidence from this study exhibited that there exists a positive but insignificant impact of exchange rate fluctuation on Nigerian economic growth in both the long run and short run. This result is attributed to the ability of the Nigerian government to effectively regulate some other important macroeconomic variables which can infuriate exchange rate which has thereby helped curtail the effects of exchange rate fluctuation during the study period. This is an indication that monetary authorities might have initiated policies that helped absorb the influence of exchange rate fluctuation on economic growth in Nigeria

Interest Rate and Economic Growth

Njie and Badjie (2021) examined the effects of interest rate on economic growth in Gambia over the period 1993 to 2017. The Vector Error Correction Model (VECM) was used to check the relationships between the dependent variable (Gross Domestic Product) and independent variables (Real Effective Exchange Rate and Real Interest Rate), both in the short-run and long-run. Post estimation tests, including Lagrange Multiplier test for residual autocorrelation were also conducted for autocorrelation, as well as Jarque Bera to test for stability and to check whether residuals are normally distributed. The empirical evidence indicates that there is no short-run association between the growth of the Gambian economy and interest rate but that there is a long run connection that runs from real interest rate and real exchange rate to GDP.

Adegoke, Azeez and Ogiamien (2021) examined the relationship between interest rate and economic growth in Nigeria, using secondary time series data. Data was collected from various issues of the Central Bank of Nigeria Statistical Bulletin and the National Bureau of Statistics. The study made use of the Augmented Dicker-Fuller (ADF) unit root tests and it was discovered that the variables were not in the same order at level, hence, the use of Autoregressive Distribution Lag (ARDL). The GDP was used to proxy economic growth as dependent variable, while Interest Rate (LR) and Exchange Rate (EXC) were used as independent variables. The result discovered that there is a negative relationship between the interest rate and economic growth though, statistically insignificant, while positive relationship exists between economic growth and exchange rate.

Utile, Okwori and Ikpambese (2018) investigated the effect of interest rate on the economic growth of the Nigerian economy. The data for the study was obtained from the statistical bulletin of the Central Bank of Nigeria from 1980 – 2016. The research design adopted for the study was the ex-post facto research design. Multiple regression technique was used for the analysis of data. The student t-test was used to test the hypotheses formulated. It was found that inflation and exchange have negative and insignificant effect on GDP. Also it was found that interest rate has positive and significant relationship with economic growth.

Inflation Rate and Economic Growth

Adaramola and Dada (2020) examined the influence of inflation on the growth prospects of the Nigerian economy, the study employs the autoregressive distributed lag on the selected variables, i.e. real gross domestic product (GDP), inflation rate, interest rate, exchange rate, degree of economy`s openness, money supply, and government consumption expenditures for the period 1980 – 2018. The study findings indicate that inflation and real exchange rate exert a significant negative impact on economic growth, while interest rate and money supply indicate a positive and significant impact on economic growth.

Nwaoha, Atanu, Ikoro and Ohajianya (2019) used Ordinary Least Square (OLS) method to examine the inflation rate and economic growth rate (proxy by GDPGR) relationship in Nigeria during the period 1982 – 2018. The result of the finding revealed that inflation rate has an inverse and significant relationship with GDPGR. This implies that a fall in inflation rate will lead to a rise in economic growth rate.

Shuaib, Augustine and Frank (2015) examined the impact of inflation rate on the economic growth in Nigeria. The study explored secondary data for the period of 1960 to 2012 and used E-view 7.2 statistical window in processing and analyzing the time series data. The empirical result of the test showed that for the periods, 1960-2012, there was no co-integrating relationship between Inflation and economic growth for Nigeria data.

Theoretical Framework

Balassa-Samuelson: The model was development by BelaBalassa (1964) and Paul Samuelson (1964). They split the economy into two sectors: tradable sector and non-tradable sector. The model has the following assumptions: the principle of demand and supply are applicable in both sectors; tradable prices are equals in the two countries, in the productive sector wages are linked to the level of productivity; labour productivity is higher in the tradable sector compare to the non-tradable sector and wages tend to equalize between the two sectors. However, the developing country has lower productivity level in the open sector compare to the developed country. For the developing country to catch-up with the developed economy, productivity must be increased in the open sector, so that wage could be increased in tradable sector without any inflationary effect.

The Mundell-Fleming model: This theory was developed in the early 1960's by Fleming and Mundell. This model is an extension of the IS-LM model to the case of an open economy. Unlike the IS-LM model which considers three markets: goods, money and asset markets, and is used to analyze the impacts of monetary policy and fiscal policy, Mundell-Fleming helps in determining exchange rate. Under this model, the balance of international payments is considered another equilibrium condition in addition to the money market and goods market. One of the most important issues addressed by the model is the trilemma, which states that perfect capital mobility, monetary policy independence and a fixed exchange rate regime cannot be achieved simultaneously. Specifically, it argues that a country cannot sustain monetary policy independence in a fixed exchange rate regime with perfect capital mobility.

3.0 Methodology

This section describes the methods adopted in accomplishing the objectives of the research study. Consequently, it examines the research design, population and sample size, the model specification, sources of data and estimation method. The software used in this is Eview 9.0. The steps include model specification, method of data analysis, and sources of data.

Research Design

The research designs adopted in this study is the Ex-Post-facto and longitudinal research design, which is very applicable in the management and social sciences. In an Ex-Post-facto research which involves secondary data in which responses in the nature of a factor and its effects on individuals are being studied, the researcher does not have the ability or opportunity to vary or manipulate the independent variables. This inability to manipulate the independent variables stern from the fact that the variables are inherently non-manipulable due to the fact that their manifestations have already occurred (Yomere and Agbonifoh, 1999).

Population and Sample

The population of the study is the Nigerian economy, while the sample size constitute the industrial sector of the Nigerian economy. The convenience sampling technique was used to arrive at the final sample for the study.

Data Sources

This study is undertaken to investigate the relationship between exchange rate volatility and economic growth in Nigeria. The study covers a period of 33 years (1986 – 2018). Relevant data shall be sourced from the Central Bank of Nigeria Statistical Bulletin (2018) and the Nigerian Stock Exchange (NSE). The data used in this study is annual time-series data covering the period 1981 to 2018. The data was primarily sourced from the Central Bank Statistical Bulletin (2018).

Method of Data Analysis

The main aim of the study is to determine the impact of exchange rate volatility on economic growth in Nigeria. In this regard, two methods are used in the empirical analysis. These are the GARCH model and the ordinary least square (OLS) econometric technique. First, the GARCH model better captures the essence of this purported relationship. In developing an ARCH model, two distinct specifications are considered - one for the conditional mean and one for the conditional variance. Moreover, a model with a first-order GARCH term and a first-order ARCH term (i.e.,GARCH[1,1]) is specified in this model because of its simplicity.

$$ECGR_t = X_t\gamma + \varepsilon_t \quad \ldots\ldots (1)$$

$$\sigma^2 = \omega + \alpha\varepsilon_{t-1}^2 + \beta\sigma_{t-1}^2 \quad \ldots\ldots (2)$$

Equation (1) is the mean equation and (2) is the variance equation. The mean equation is written as a function of exogenous variables (in this case, the major factors in economic growth) with an error term. σ_{t-1}^2 is the conditional variance because it is the one-period ahead forecast variance based on past information. The conditional variance equation specified in (2) is a function of three terms:

·News about volatility from the previous period, measured as the lag of the squared residual from the mean equation: ε_{t-1}^2 (the ARCH term).
·Last period's forecast variance: σ_{t-1}^2 (the GARCH term).

Based on the results from the estimation of this GARCH model, the volatility of the industrial sector would be explained. More importantly, economic growth volatility data will be generated from the GARCH model. According to Greene (2002), volatility of a variable is obtained from the GARCH model as the square root of the residual of the estimated model.

Next, we perform also the Ordinary Least Squares (OLS) estimation technique which is the Best, Linear Unbiased Estimator. It is based on the minimization of the sum of squares residuals of the model. Hence, the estimation technique of time series data that is employed in this study is the Ordinary Least Squares OLS) method that easily estimates the behavioural relationships among time series variables. The coefficients obtained from the estimation are then used to verify the working hypotheses of the study.

Model Specification
The functional form of the model is stated thus:
ECGR = f(EXRTV, RGDP, INFL, INTR)…….....(1)
The econometric form of the model is stated thus:
$ECGR = \alpha_0 + \alpha_1 EXRTV + \alpha_2 RGDP + \alpha_3 INFL\ \alpha_4 INTR + \mu$ ……(2)

Where:
ECGR = Economic growth
EXRTV = Exchange rate Volatility
RGDP = Real Gross Domestic Product
INFL = Inflation Rate
INTR = Interest Rate
μ = the error term
α are the respective estimators while μ is the error term.

The apriori expectations of the model are $\alpha_1, \alpha_2 > 0$: $\alpha_3, \alpha_4 < 0$

4.0 Presentation and Interpretation of Results

The aim of this study is to empirically estimate a model that helps explain the relationship between economic growth and exchange rate volatility in Nigeria. However, because some recent studies on macroeconomic variables in Nigeria which suggest that time series aggregates data are not stationary in their level form but that their first-order differences are (Akinlo and Folorunso, 1999; Nwaobi, 2000), there is the need to investigate the stationarity of variables in the model by performing the unit root testing.

Unit Root Test Analysis
Generally, unit root test involves the test of stationarity for variables used in regression analysis. The importance of stationarity of time series used in regression borders on the fact that a non-stationary time series is not possible to generalize to other time periods apart from the present. This makes forecasting based on such time series to be of little

practical value. Moreover, regression of a non-stationary time series on another non-stationary time series may produce spurious result.

Since the data set is time series, the time series properties was first examined in order to ascertain whether or not the selected variables are stationary in level or possesses unit roots. This involves the unit root test in which the augmented Dickey – Fuller (ADF) method was employed. The result of the unit root test in levels is presented in Table 1 below. In the result, none of the ADF statistics of the variables is greater than the 95 percent critical value. This indicates that the variables are not stationary in levels and are actually time-dependent.

Table 1: Unit Root Test for Variables in Levels

Variable	ADF Test Statistic	95% Critical ADF Value	Remark
ECGR	-0.21254	-2.943427	Non-Stationary
EXRT	0.967001	-2.943427	Non-Stationary
INFL	-2.839193	-2.943427	Non-Stationary
INTR	-5.649542	-2.943427	Non-Stationary

Source: Result computed by author from the Eviews 9.0 Output, 2022

Box and Henkins (1978) have argued that non stationary time series in levels may be made stationary by taking their first differences. A given series is said to be integrated of order *d* (denoted *I(d)*) if it attains stationarity after differencing *d* times. If the series is *I(1)* it is deemed to have a unit root.

The result of the unit root test on these variables in first differences is reported in table 2 below. From the result, it is seen that the ADF test statistic for each of the variables is greater than the 95 percent critical ADF values (in absolute values). With these result, these variables are adjudged to be stationary. This implies that the variables that were initially non-stationary are actually difference-stationary, attaining stationarity after the first differences of the variables. Thus, we would accept the hypothesis that the variables possess unit roots. Indeed, the variables are integrated of order one (i.e. I[1]).

Table 2: Unit Root Test for Variables in First Difference

Variable	ADF Test Statistic	95% Critical ADF Value	Remark
ECGR	-7.606918	-2.945842	Stationary
EXRT	-5.242926	-2.945842	Stationary

INFL	-6.253647	-2.948404	Stationary
INTR	-7.211036	-2.948404	Stationary

Source: Result computed by author from the Eviews 9.0 output.2022.

Exchange Rate Fluctuation Result

The initial set of analysis in this study is to investigate the pattern of movement and other properties in exchange rate fluctuation in Nigeria. The result of the GARCH (1,1) model used for generating the volatilities in the estimates are reported in table 3 below. In the result, the coefficient of the lagged variable is highly significant at the 1 percent level, suggesting that past exchange rate have significant influence on current exchange rate. Moreover, the ARCH and the GARCH terms in the model are both significant. This shows that there is indeed deep volatility in stock market for the period. In particular, the significant and positive ARCH term indicates that news from past period's volatility affects exchange rate movement than current period. The coefficient is negative, suggesting that past period's volatility tends to limit current exchange rate. The significance of the GARCH term indicates that volatility can be perpetual in the market.

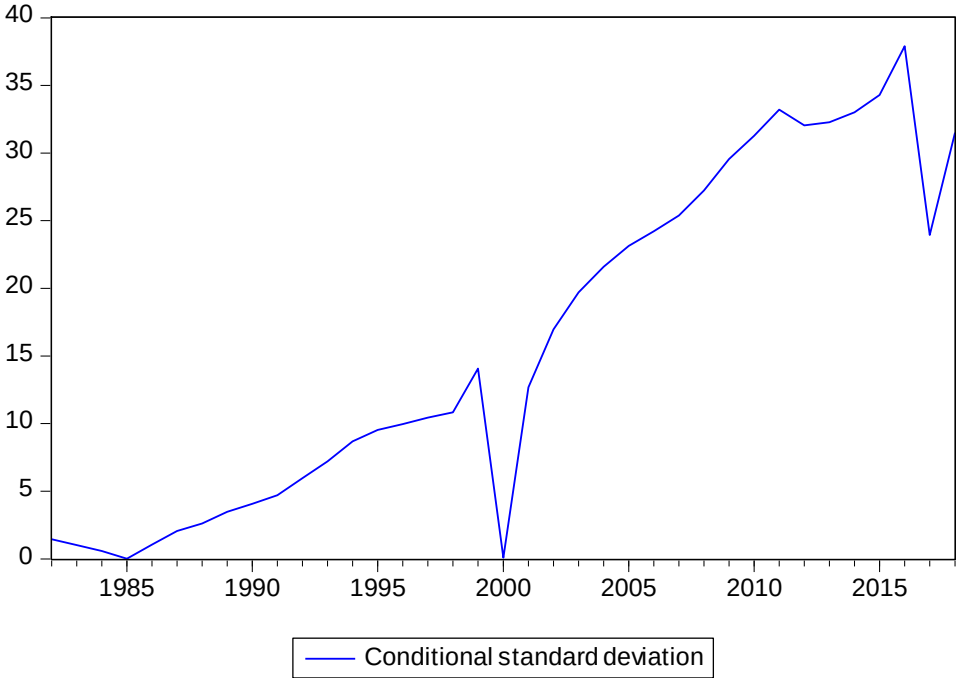
Table 3: The GARCH RESULT FOR Stock Market Fluctuation

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.061833	0.982946	0.062906	0.9498
EXRT(-1)	1.100060	0.042458	25.90927	0.0000
	Variance Equation			
C	-1.480719	0.164083	-9.024211	0.0000
RESID(-1)^2	-0.057733	0.052039	-1.109410	0.2673
GARCH(-1)	0.656164	0.269978	2.430436	0.0151
ECGR	0.001289	0.000969	1.330566	0.1833
EXRT	1.117153	0.358402	3.117035	0.0018
R-squared	0.920	Mean dependent var		95.6272
Adjusted R-squared	0.918	Durbin-Watson stat		1.969

Source: Author's Computation from E-views

In figure 1 the trend in exchange rate volatility is shown. The charts show that exchange rate movements have been more rapid since 1985 when marked movements in the economy began to be noticed. The volatility increased after 2000 and culminated in the deep sections seen between 2016 and 2017. Apparently, volatility in the country continued since then, although with a lower amplitude.

Fig. 1: Exchange Rate Volatility



Regression Analysis

The results of the OLS estimation is presented in table 4 below. In the results, the diagnostic indicators are very impressive. The model is shown to have a strong predictive ability as is shown in the high R squared value of 0.92. This shows that over 92 percent of the systematic variations in economic growth in Nigeria is captured by changes in the explanatory variables. The adjusted R-squared value of 0.91 percent is also very high and it implies that the model has a very high predictive ability. The overall relevance of the model is observed by considering the F-statistic in the model. The F-value of 99.02837 is very high and is significant at the 1 percent level. The model therefore passes the overall significance test at a very high level. Thus, we cannot reject the hypothesis of a significant linear relationship between the EXRTV and economic growth in Nigeria. It is therefore apparent that the combined effects of EXRTV and related variables in the model have significant effect on economic growth in the Nigeria overtime.

Table 4: Exchange Rate Fluctuation and Economic Growth in Nigeria (OLS)

Variable	Coefficient	T-Ratio	Prob.
Constant	-67188.74	-5.479582	0.0000
EXRT	-36.07699	-0.353310	0.7261
RGDP	4.216802	8.477385	0.0000**
INFL	-139.5243	-0.521193	0.6057
INTR	-286.5206	-1.046420	0.3030
$R^2 = 0.92$	$\bar{R}^2 = 0.91$	F = 99.02837	DW Statistic = 1.5

Author's Computation 2022. Note: ** Sig. at 1% level.

The role played by each of the variables in the model in explaining economic growth in Nigeria is observed through the estimated coefficients of the respective variables in terms of their values, signs and significance. In the result above, all the variables are correctly signed and in line with the expected positive a-priori signs in the model.

The particular relevance of each variable in the model can be considered by looking at the significance of each of the coefficients in the model. In the result above, the coefficients of Exchange rate (EXRT), inflation rate (INFL) and interest rate (INTR) are negatively signed and do not have any significant impact on economic growth in Nigeria. This implies that, in the determination of economic growth and development in Nigeria, these variables are not relevant in the process. However, the coefficient of real gross domestic product (RGDP) is positive and significant at the 1 percent level. This means that the level of economic activities in the country is a significant factor in the determination of the growth of the Nigeria economy.

The overall results obtained from the model estimation are effectively acceptable because the D.W. statistic value of 1.50 is in order and implies that there is no autocorrelation in the model. Thus, the results are applicable for structural analysis as well as policy decisions.

5.0 Summary, conclusion and recommendations

5.1 Summary of Findings

The study examines the impact of exchange rate fluctuation economic growth in Nigeria. On the basis of the empirical analysis, the following specific findings were made:

- That exchange rate does not have any impact on economic growth in Nigeria.
- That interest rate does not have significant impact on economic growth in Nigeria.
- That inflation rate does not have significant impact on economic growth in Nigeria.

5.2 Conclusion

The study has empirically examined the impact of exchange rate fluctuation on economic growth in Nigeria for a period of 38 years (1983 to 2020).The E-GARCH MODEL was employed to generate the fluctuation while the ordinary least square (OLS) was used in the analysis. The trend in exchange rate fluctuation shows that exchange rate movements have been more rapid since around 1985 when marked movements in the market began to be noticed. The volatility increased after 2000 and culminated in the deep sections seen between 2016 and 2019. Apparently, exchange rate fluctuation in the Nigerian economy has continued since then, although with a lower amplitude. Generally, the results from the OLS indicate. all the variables in the model do not have any impact on economic growth in Nigeria.

5.3 Policy Recommendations

The results obtained from this study provide strong implication for the government, regulators and investors. First, the government should control and regulate the exchange rate in the country in order to boost trading activities and returns in the Nigerian stock market.

Second, the importance of exchange rate fluctuation should be taken into account. Hence, the Nigerian government and regulators should try to either prevent or reduce the level of volatility in the market. They should also try to prevent a currency crisis by expanding the stock market and putting all necessary legal and regulatory framework in place to attract capital inflow from outside the country either in form of foreign direct investment or foreign portfolio investment in order to deepen and broadening the market and thus stimulating the growth and development of the Nigeria economy

Finally, a healthy macroeconomic and financial system is critical if the industrial sector is to grow rapidly. At the heart of industrial sector are the real exchange rate, interest rate and exchange rate. To prevent catastrophes from happening in the sector, the relevant regulatory authorities need to take steps to ensure that the Nigerian economy functions effectively as an economic growth hub for the country.

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CONSUMER PROTECTION AND PUBLIC HEALTH IN NIGERIA

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Abstract
Public health issues in Nigeria have assumed a central position in policy making in recent times for Nigeria. This paper examines the effect of consumer protection on public health in Nigeria. A dynamic estimation structure was designed for the analysis, using the VECM technique and quarterly data for the period 2009q1 to 2017q4. It is found that consumer protection has a very strong effect on public health in Nigeria, through reduction in mortality rates and increase in life expectancy in the country. Moreover, government expenditure exerts effective and positive impacts on public health in Nigeria, while rising income per capital is demonstrated to have the ability of promoting overall public health among Nigerian citizens, especially in the long run. The study therefore recommended that proactive government policies on consumer protection should be directed towards the health sector through increased sensitization on healthy living as well as dangers of certain lifestyles. Moreover, there should also be increased surveillance with respect to the use of drugs and other treatment patterns among the Nigerian health sector practitioners.

***Keywords**:* Consumer confidence index, life expectancy, mortality rates, government health expenditure

JEL Codes: C32, E27, H63

1.0 Introduction
Public health issues in Nigeria have assumed a central position in policy making in recent times in Nigeria. At present, the major health indicators for Nigeria are among the worst in the world. For instance, Nigeria shoulders 10% of the global disease burden and is making slow progress towards achieving the Sustainable Development Goals targets for the health-related aspects. Infant mortality rate is at 201 infants per 100,000 live birth, maternal mortality rate is 80 per 100,000 live birth, while physicians in the country are in the ratio of 39 per 100,000 population, World Bank Development Indicators (WDI, 2020). In recent times, there have been many policy-based approaches to address the health crisis in Nigeria, though it is being noted that such policies are inadequate given the size of the country. The inadequacies observed in the programs designed to address the numerous health problems in Nigeria have led to the little improvement in country's health status. Besides, the continued neglect of the importance of addressing public health issues intensifies the challenges of overall heath situation in the country.

Nigeria is regarded as an import-dependent nation, much of the merchandise goods that flows into the country are manufactured goods such as cars, capital machineries, drugs, chemicals, etc. These goods are usually subjected to regulatory inspection and quality conformity in other to ensure that they meet certain stipulated standards. Drugs that do not meet the regulatory standards are by far the most detrimental to the well-being of the

citizenry, they are highly monitored, inspected and assessed (Rolland, 2014). This is because, a single fake drug can wipe out a whole nation. It is in this regard that the National Agency for Food and Drugs Administration and Control (NAFDAC) and the Standard Organization of Nigeria (SON) were established. Both agencies are concerned with the regulation and control of drugs and food related products whose consumption if not properly and closely monitored to ensure quality standard may have wholesale detrimental effect on the entire nation.

To this end, foreign drugs imported into the country are closely inspected to ensure safety of the populace. However, NAFDAC have assumed greater prominence over the years on account of the fact that its jurisdiction covers both food and drug- related products, with that of SON concerned primarily with food. The institutional set ups of both agencies are important to the public health safety of Nigeria, as cases of highly sub-standard and proliferated drugs have been widespread in the country, with many people become vulnerable. With increased trade between Nigeria and other countries, the destructive effect of sub-standard goods, particularly, drug related goods and chemical have become more discernible. While greater attention has been placed by the regulatory agencies on foreign imported drugs, increased attention has also been placed on the domestic environment, as the public health safety of the populace is of paramount important, particularly with fake drug manufacturers all over the country.

As regards consumer protection, a number of stipulated provisions are designed to protect the rights of the consumer against substandard products and unethical, unfair sharp, and unwholesome practices (Bernauer & Meins, 2002). This being the case that if the rights of the consumer are not protected and guaranteed, the consumer might be subjected to various undercut tendencies that may deny him /her the money worth of the goods he /she has purchased. Thus, the consumer's right is protected under various consumer protection provision that that enables him / her gets the true worth of his money spent in the purchase of goods. Such consumer protection rights enhance the health and safety of the consumer (OECD, 2010).

However, consumer protection as a theory was given serious attention by J. E. Kushman of the University of Delaware, USA in 1999, which the author propounded concerning health care. The theory uses the neoclassical economic principles to articulate the theory of Consumer Protection in health care. The theory assumed that consumers maximize perceived expected utility, which is a function of price and quality of their service. Consumers who purchase health care services ultimately buy quality – effectiveness and efficiency. Thus, theory of consumer protection holds that quality is the probability that a service will be safe and effective (Kushman, 1999). Consumers are marketed when the tradeoff they made in purchase of health services offer effectiveness for their money. Consumers perceive either the price quality tradeoffs offered by sellers accurately or they perceive those tradeoffs inaccurately. Again, or they perceive the product worth, that when the perceived quality of services is in tandem with price(s) paid for such services, the consumer must have been accurate in his or her evaluations of such services and is therefore protected as he/she obtains consummate quality for price(s) paid for services. Whereas he or she who fails to accurately evaluate the quality of services, he/she becomes susceptible to exploitations paying more than the service worth. The Nigeria, there exist knowledge imbalance and consumers had over the years suffered so much in

the hands of producers and suppliers of goods and services with whom they were engaged in trade relationships in terms of supplying sub-standard goods and services, fake and expired products. Fake products are those goods and services that fail to meet up to the promised specification, conformance and performance quality (Nkamnebe, Idoko & Kalu, 2009). These have implications on the health of consumers.

In order to address the worsening health conditions in the country, a holistic approach is the necessary to provide proper forms of policy dimensions. In this study, we consider how consumer protection, in various ways, affects overall public health in Nigeria. In particular, we examine the dynamic channels of influences of protection measures on public health components of quality of life and child health conditions in Nigeria. Thus, an approach that includes consumer protection would address such challenges at the outset. Aside the introductory section, the paper is organized as follows. Section two consists of literature, which briefly reviews the consumer protection-public health nexus, as well as the empirical literature. Section three presents the methodology, model specification and data, while sect5ion four presents the empirical results and analysis. The conclusion and policy recommendations are presented in section five.

2.0 Literature Review

The basic formulations on the roles of consumer protection and citizen welfare are founded on the classical assertion of customer supremacy and the impacts of free trade. The empirical research in this direction has used the classical settings to evaluate the extent of protection, especially for well-developed economies.

Kamarudeen, Suleiman and Danjuma (2012), conducted a study on the issues and the challenges relating to consumerism and consumer protection in Nigeria with particular attention to the Consumer Protection Council (CPC) Act C25 of 2004. The study used Quantitative Method with Inductive Approach. The findings of the study were that the Consumer Protection Council (CPC) Act C25 recognized the rights of the consumers; but it does not specifically provide how these rights would be enforced, as they were merely implied and subsumed into the functions of the council and the state committees established by the Act. The study concluded that the mere existence of the law is not enough and solicited for specific protection and compensatory measures being clearly stated to enable CPC to tackle infringements on any of the consumers rights.

In another development, Nkamnebe, Idoko and Kalu (2009), conducted a study that examines the complex issues of consumer protection in Nigeria with the aim to understanding the role of relevant stakeholders in protecting the rights of Nigerian consumers. The study utilized questionnaires and depth interviews conducted among selected consumers and institutional buyers, as well as employed observation method especially in supermarkets, open markets and departmental stores in Enugu and Onitsha (Nigeria). The study also examined the Consumer Complaint Behaviour and observed the complexity of the process by which a consumer will decide about what he/she will do after experiencing dissatisfaction. Findings from the study revealed that Nigerian consumers do not take time to study the labels and products before buying and as a result, they rarely have full information about the products they buy. Moreover, most consumers indicated that the languages or the terms used to describe the products especially pharmaceutical products are too technical for them to understand, coupled with the fact

that consumers' awareness of the laws meant to protect them is generally low. If this is the case, the health of consumers may be at stake when the awareness of the law to protect them are unknown to them.

Yaqub, Ojapinwa and Yussuff (2012) estimated the impact of public health expenditure and governance on under-five mortality rates in Nigeria using OLS and 2SLS. The study covers 1980 to 2008.They estimated the direct effect of public health expenditure on under-five mortality and the interaction effect between public health expenditure and corruption levels. Without the interactive variable the OLS and 2SLS estimates indicate that increasing public health expenditure by 1% increases under-five mortality rates by 0.03% and 0.05% respectively. In the model with the interactive variable, the level of corruption significantly reduced under-five mortality and the interaction between public health expenditure and level of corruption is positive and significant. In the 2SLS, increasing public health expenditure by 1% at the mean of corruption level (0.78) in Nigeria raises under-five mortality rates by 0.01%. The study used small sample (30 observations) such that with several explanatory variables few degrees of freedom are available for statistical inferences. The paper does not also examine the time series properties of the data. Thus, the estimation results maybe spurious. In general time series studies do not control for unobserved heterogeneity. Second, the studies focus on a single country or region. This may impede generalization of the study results to other countries. In another empirical study, Chowdhury, Botlero, Koblinsky, Saha, Dieltiens and Ronsmans (2007) conducted a study to understand the dramatic improvements in the maternal mortality rate in Matlab direct, Bangladesh between 1976 and 2005. Matlab district, had her maternal mortality fallen by 68% from 412 per 100,000 live births over the study period. To understand the rationale responsible for the dramatic decline, the case study was conducted by analyzing dataset from household surveys carried out over the time period with a special focus on socio-economic indicators. The findings from the multivariate analysis revealed that access to -family planning and safe abortion was largely responsible for the dramatic fall in maternal death.

Arshia and Gerdtham (2013) examined the relationship between child health outcomes and economic growth in different countries at different income levels, and given such relationships, as well as to estimate the direction and magnitude of these relations. The objective of their study was to examine the relationship between maternal mortality, child mortality and economic performance. The study improved on the estimate of the effect of reductions in child mortality on GDP by taking into account other growth related factors as well as adopting the Barro (1990) growth models in combination with Data Envelopment Analysis (DEA). Using the model, it estimated how much a decrease in child mortality may increase GDP for each country. Results showed that in 105 of 108 (58%) countries, there existed bi-directional relationships, which indicated that in the majority of countries, changes in under-five mortality have an impact on GDP, and vice-versa while in 49 countries (27%) result showed one-way causality from under-five mortality to GDP and in 14 countries (8%) there was one-way relationships from GDP to under-five mortality.

For many developing countries, health expenditures have been largely based on government participation, which suggests that public spending should essentially

determine health outcomes. Gupta, Verhoeven and Tiongson (2001) using data or 1990-999 period on 70 countries find a positive impact of public health expenditure on health outcomes, indicated by life expectancy. Specifically, he finds that health expenditure and pro-health policies, such as consumer health protection enhance public health in terms of life expectancy. Baldacci, Guin-Siu and Mello (2003) using cross-sectional data for 94 countries examine the relationship between public health expenditure and life expectancy. The results from the Ordinary Least Squares (OLS) and Two Stage Least Squares (2SLS) show that increased public health expenditure raises the life expectancy of the people through the reduction of infant and child mortality.

Ayanwu and Erhijakpor (2007) investigated the effect of health expenditure on health outcomes in Africa, using *data* for 47 African countries. Employing OLS and 2SLS technique, the results show that health expenditure has a statistically significant in raising the public health status (life expectancy) of Africans. Novignon, Olakojo and Novignon (2012) examined the impact of public and private health expenditure and other health policies on health status in Sub-Saharan Africa. Using the generalized least square estimator (GLS) to estimate both the fixed and random effect models for 44 Sub-Sahara Africa (SSA) countries, they found that health expenditure and other health-enhancing policies leads to improvement in life expectancy at birth, with the effect of public health expenditure higher than that of private health expenditure.

Sede and Izilein (2014) conducted a study on the relationship between maternal mortality ratio (MMR) and economic growth in Nigeria for the period 1980 to 2011. Specifically the authors' objective was to empirically determine the impact of government spending on health (FEH), per capita income (GDPGR), Unemployment rate (UPR), Secondary School Enrolment rate (SECER) on MMR. The study specified the Grossman death model and utilized the ordinary least square (OLS) technique to estimate it. Results showed that while all other explanatory variables passed the significant test at 5% level of significance, GEH was insignificant at the same 5% of significance as it only had a meagre impact of 0.008 on MMR. It was recommended that government expenditure should be increased in order to improve maternal health.

3.0 Methodology

The empirical strategy for this study is based on the assumed relationship between consumer protection and public health in Nigeria. Indeed, the pattern of relationship may be bi-directional given that the three variables may likely stimulate each other over time. Thus, the appropriate empirical procedure is adopted for the analysis.

3.1 Model Specification

In this study, it is argued that consumer protection and public health are related in terms of consumer welfare combinations in Nigeria. In order to examine a more systematic relationship between trade, consumer protection and public health in Nigeria, the empirical strategy adopted in this study is dynamic analysis of the three main variables. This is structured as a simultaneous system in a Vector Error Correction Model (VECM) framework using quarterly time series data. This method, as also adopted by Adegboye (2014), provides an elaborate platform for examining the dynamic interactions among the basic variables of consumer protection on public health in Nigeria. The system of equations representing the short run relationships which is estimated in the Johansen

method is a vector error correction model (VECM) derived from a standard unrestricted vector autoregressive model (VAR) of lag length *k*. The VAR system of equations can be algebraically re-arranged into a VECM, written as:

$$\Delta z_t = \Gamma_1 \Delta z_{t-1} + \cdots + \Gamma_{k-1} \Delta z_{t-k+1} + \Pi z_{t-1} + \mu + \varepsilon \qquad (1)$$

where $\boldsymbol{z_t}$ is the vector of variables. It should be noted that two sects of vectors are derived in this study since two variables are used to capture public health, namely, life expectancy at birth (*lexp*) and child mortality rate (*mort*). These two variables are the major components of health outcomes especially for developing countries where other health indicators are difficult to compute (AbouZahr & Wardlaw, 2003; Bein, Unlucan, Olowu & Kalifa, 2017). The first group of terms on the right-hand side of (1), up to and including z_{t-k+1}, represents the short run lagged effects of differences in the three variables in *z*, or Δz, on each variable in the system, Πz_{t-1}, is the error correction term (ECT) that represents the long run cointegrating relationships between the levels of the variables in *z*. Based on the VECM specification, the vector *z* is specified in two forms as:

z = (lexp, cci, geh, gdppc)

where lexp = life expectancy (to proxy public health)
cci = consumer confidence index (to proxy the level of consumer protection)
geh = government health expenditure
pci = per capita income

The second z component is specified as:

z = (mort, cci, geh, gdppc)
where mort = mortality rate (another proxy for public health)

3.2 Method of Data Analysis and Sources of Data

As stated above, the study employs the Vector Error Correction Methodology (VECM) to identify the dynamic relationships among the main variables in the study. This pattern of analysis requires initial tests on the time series properties of the data for which the study used unit root and cointegration testing. The data used in the study is quarterly time series data covering the period 2009q1 to 2017q4. The choice of the data set is based on the fact that data on consumer confidence index only started to be published by the Central Bank of Nigeria (CBN) in January 2009. Thus, data on consumer confidence index, government health expenditure, and per capita income were sourced from the CBN Statistical Bulletin, (2019) while data on life expectancy and child mortality rates and sourced from the World Bank Development Indicators (WDI) (2020)

4.0 Presentation of Results and Analysis

4.1 Descriptive Statistics

In this section, the descriptive statistics of the data used in the study are initially presented. Descriptive statistics show the summary of data and other basic characteristics within the series. Summary statistics for all the variables in the study are reported in Table 1 below. Average child mortality rate is 72.49 per one thousand children for Nigeria. This average is relatively high for Nigeria and indicates poor level of public child health in the country. Life expectancy is also low on average at 53.16 over the period. In general, there is indication that public health in Nigeria is not quite impressive. Both the maximum and minimum values of the health indicators also underscore the generally weak public health status among Nigerian citizens. The J-B value for both life

expectancy and mortality rate is not significant at the 5 percent level. This implies that for these two health indicators, the outcomes have been similar over time without any outstanding changes occurring during the years.

The average consumer confidence index for the period under study is -10.76, which is negative and suggests low confidence among consumers in Nigeria. The maximum confidence value is 3.30, which is also low. The negative mean value clearly shows that many consumers n Nigeria do not have enough confidence n their consumption patterns and choices. Average government expenditure is at 325.88, with a relatively low standard deviation value. This highlights the fact that health expenditures have been steadily low by the Federal government in Nigeria since 2009.

Table 1: Summary Statistics

Variable	Mean	Max.	Min.	Std. Dev.	Skewn.	Kurt.	J-B(prob)
Mort	72.49	83.18	63.14	6.00	0.15	1.83	0.35
Lexp	53.16	55.66	51.22	1.24	0.24	2.04	0.43
Cci	-10.76	3.30	-29.80	9.41	-0.62	2.37	0.24
Geh	325.88	396.47	145.54	71.79	-1.49	4.07	0.00
Grgdppc	1.11	11.48	-16.20	8.27	-0.97	2.55	0.06

Source: Authors' computations

Average GDP per capita growth for the sample period is 1.11 percent which is relatively low considering the fact that this is an essential factor for sustainable long run growth in an economy (Harris, 1999). The maximum growth of 11.48 percent and the minimum value of -16.20 percent give clear indications that the rate of growth has moved rather diametrically over the period of the study. This wide dispersion is confirmed by the relatively high standard deviation value for the variable. From the Table it is seen that, income per capita growth has been generally unstable in the country of the years. The skewness value for the distribution is slightly high at -0.97 suggesting that the per capita GDP growth series were not quite centred around the mean value; the high kurtosis value also confirms this outcome. The Jarque Bera value is significant at the 10 percent level, indicating that the hypothesis of normality in the distribution cannot be accepted.

In order to further evaluate the initial patterns of relationships among the variables, the correlation coefficients among pairs of variables in the study are presented and analysed. The correlation matrices for the main explanatory variables in the study are reported in table 2 below. The results in the Table also contain the probability values for the t-ratios accompanying each of the correlation coefficient. A significant negative correlation is seen between mortality rate and life expectancy, as expected. This shows that higher life expectancy also entails lower mortality rates. Consumer confidence index has a positive correlation with mortality rate, trade, government expenditure and per capita income. The relationship between trade and both mortality rate and life expectancy is weak and not significant.

Table 2: Correlation Coefficients

	Mort	*Lexp*	*Cci*	*Geh*
Lexp	-0.989			
	0.000			
Cci	0.180	-0.202		
	0.300	0.245		
Geh	-0.753	0.713	-0.063	
	0.000	0.000	0.718	
Pci	0.059	-0.039	0.088	-0.080
	0.736	0.822	0.615	0.647

Source: Authors' Computations Using E-Views

4.2 Unit Root and Cointegration Analysis

Table 3 presents results of Augmented Dickey Fuller (ADF) and Philip-Perron (PP) tests in levels and first differences without taking into consideration the trend in variables. In all cases, the three variables in level form were non-stationary but their first differences were found to be stationary, i.e I(1). It is therefore appropriate to employ the cointegration analysis to estimate the relationships among the variables, provided that the method chosen allows for possible joint endogeneity of all four variables (Guest & Swift, 2008).

Table 3: Unit Root Test for Variables

Variable	**ADF Test**		**Phillip-Perron Test**		**Order of Integration**
	Levels	*First Difference*	*Levels*	*First Difference*	
Lexp	2.141	-5.14*	2.937	-7.67*	I[1]
Mort	-1.373	-7.922	-1.287	-8.835	I[1]
Cci	-2.329	-6.155*	-2.298	-6.157*	I[1]
Geh	-3.808*	-3.165*	-3.938*	-6.038*	I[8]
Pci	-1.034	-5.458*	-1.244	-7.048*	I[1]

*Note: * indicates significant at 5 percent*
Source: Authors' computations

Given that the study focuses on error correction processes, test for a common stochastic trend is also conducted in this study. This involves the existence of a cointegrating relationship between trade, consumer protection and public health variables. The test results in Table 4 indicate that the null hypothesis of no cointegration among the variables is rejected at the 5 per cent significance level for both the λ-max and Trace test. Thus, a long run relationship is shown to exist between consumer protection and the public health variables.

Table 4: Multivariate Cointegration Test Results

Hypothesized No. of CE(s)	Life expectancy		Mortality rate	
	Trace Statistic	Max-Eigen Statistic	Trace Statistic	Max-Eigen Statistic
None*	116.22	48.18	104.73	47.26
At most 1*	68.04	31.59	57.47	22.82
At most 2*	36.45	17.60	34.65	17.89
At most 3*	18.86	12.02	16.76	10.72
At most 4*	6.83	6.83	6.04	6.04

*** denotes rejection of the hypothesis at 1%significance level*
Source: Authors' computations

Moreover, the Johansen test is highly susceptible to the lag structure of the VAR estimation the lag selection test is also conducted using Wald lag exclusion test in order to determine the appropriate lag structure for the VAR. Based on the significance level of the t-values for each lag structure, the result shown in Table 5 indicates that only one lag is expected to be retained for the VAR estimation.

Table 5: Wald Lag Selection Test

	d(mort)	*d(lexp)*	*d(cci)*	*d(geh)*	*d(gdppcg)*	*Joint*
Lag = 1	31.22	11.39	28.49	33.26	21.43	68.81
t-value	[0.00]	[0.01]	[0.00]	[0.00]	[0.00]	[0.00]
Lag = 2	1.09	1.17	7.03	4.24	2.14	1.32
t-value	[0.61]	[0.76]	[0.07]	[	[0.33]	[0.70]
Lag = 3	4.31	7.06	3.67	4.01	4.09	3.09
t-value	[0.23]	[0.07]	[0.26]	[0.30]	[0.10]	[0.28]
Lag = 4	2.53	2.22	1.67	1.96	3.47	3.01
t-value	[0.61]	[0.71]	[0.66]	[0.62]	[0.41]	[0.29]

Source: Authors' computations

4.3 VECM Results

The result of the long run coefficients of the VECM estimation is reported in Table 6 for the two vectors of equations (i.e. for mortality rate and life expectancy). The cointegrating vectors are all normalised on the coefficients of either *lexp* or mort in order to facilitate comparison of the relationship since these are the variables of interest. For the two sets of equations, the coefficient of consumer confidence is positive in the standardized long run estimation for life expectancy, while it is negative for mortality rate. The coefficients are significant in both cases. This shows that in the long run, consumer confidence actually promotes life expectancy and reduces the incidences of mortality in Nigeria. Apparently, with more consumer protection by the government, overall public health will be improved in Nigeria. The long run coefficients in the results thus show a stable relationship between consumer protection and public health in Nigeria.

Table 6: Long Run Coefficients of the VECM

	Life expectancy Eqn				*Mortality Eqn*			
	Δ*lexp*	Δ*cci*	Δ*geh*	Δ*pci*	Δ*cmort*	Δ*cci*	Δ*geh*	Δ*pci*
	1	0.01	-0.01	0.38	1	-0.02	-0.08	-1.83
	-	(2.03)	(-0.7)	(6.2)	-	(-5.35)	(-3.3)	(-10.2)
	Equations of the system:							
Dependent variable	Δ*lexp*	Δ*cci*	Δ*geh*	Δ*pci*	Δ*mort*	Δ*cci*	Δ*geh*	Δ*pci*
	-0.07	-0.92	-0.03	(2.06)	-0.06	-6.16	0.17	-0.88
	(-3.73)	(-1.3)	(-0.1)	(1.89)	(-3.40)	(-0.86)	(0.63)	(-2.74)
R^2	0.51	0.47	0.65	0.73	0.76	0.51	0.66	0.78
LM test for autocorrelation of the system: p-value = 0.615								
Doornik-Hansen test for normality of the system: p-value = 0.757								

Note: ** indicates significance at 5 percent level; Source: Authors' computations

The coefficient of government expenditure is only significant for the mortality rate equation, while that of per capital income is significant in both results. This result demonstrates that increased income levels actually lead to higher life expectancy and lower mortality rates. N the same vein, more government spending tends to reduce mortality rates in Nigeria. Thus, these results show that in the long run, government expenditure and increased economic performance are essential for boosting public health in Nigeria.

Table 6 also gives the α or speed-of-adjustment coefficients on the long run ECT in the error correction model (ECM) for each variable in the system. This coefficient further demonstrates that pattern of time-varying relationships among the variables in Nigeria. ECT for both *lexp* and *mort* equations possess the expected negative values that indicate tranquil long run adjustments. This implies that any short-term movement or disequilibrium in public health outcomes in Nigeria will always be restored in the long run. The ECT coefficients of consumer confidence index are also negative in both results, showing that there is long run stability for consumer protection in Nigeria.

Finally, we report the results of the Forecast Variance Decomposition based on the estimated VECM in Table 7. As noted in Nguyen (2011, p.), Variance Decomposition "tells how much a given variable changes under the impact of its own shock and the shock of other variables". The variance decomposition is performed for the two sets of

equations (involving life expectancy and mortality rate). For the decomposition of life expectancy, most of the variances are explained by itself and per capita income over the period. Consumer confidence index plays a slightly small role in the variance decomposition, suggesting that consumer protection only has fringe explanation for changes in life expectancy. The role of CCI in mortality rate decomposition is however smaller than that of life expectancy.

Table 7: Variance Decomposition Results

Period	LEXP	CCI	GEH	GDPPC	MORT	CCI	GEH	GDPPC
Variance Decomposition of LEXP:					*Variance Decomposition of MORT:*			
2	92.13	0.00	0.17	7.59	64.98	0.82	0.01	32.79
4	79.49	1.56	3.51	15.31	95.16	0.09	0.05	4.43
6	72.64	2.87	4.44	19.95	61.98	0.75	0.08	35.74
8	68.56	3.46	6.27	21.65	91.76	0.21	0.05	7.31
10	63.91	4.05	8.53	23.44	61.29	0.74	0.05	36.85
Variance Decomposition of CCI:					*Variance Decomposition of CCI:*			
2	0.81	82.43	14.50	0.07	3.05	79.92	13.09	2.10
4	2.07	84.93	9.08	2.28	19.21	66.57	9.83	1.89
6	2.92	85.98	6.40	3.28	33.42	46.91	5.13	13.05
8	6.91	80.16	5.20	6.62	76.97	7.31	0.63	14.17
10	8.59	75.91	5.47	9.18	85.85	1.64	0.16	11.86
Variance Decomposition of GEH:					*Variance Decomposition of GEH:*			
2	4.41	11.48	80.87	0.00	5.80	16.67	73.38	0.24
4	3.03	9.95	84.27	0.36	12.50	15.85	68.25	0.61
6	1.75	9.29	86.13	0.62	10.82	16.90	68.41	1.46
8	1.16	8.57	87.06	1.12	16.88	16.01	60.80	4.45
10	0.79	7.84	87.72	1.63	39.03	10.90	42.45	6.06
Variance Decomposition of GDPPC:					*Variance Decomposition of GDPPC:*			
2	38.79	5.14	11.40	41.19	30.54	35.05	1.44	30.32
4	41.98	4.40	9.73	39.66	82.21	8.38	1.08	7.68
6	45.61	4.23	14.85	31.83	58.45	5.86	0.37	33.85
8	46.58	4.25	15.05	29.99	87.86	0.57	0.13	10.52
10	50.12	3.72	16.98	25.76	74.55	0.57	0.05	24.14

Source: Authors' computations

The decomposition of CCI however has very interesting outcome. Mortality rate has a very large role in the variances in CCI, while life expectancy has a low explanatory power. This shows that consumers are more responsive to factors that can contribute to their death than to factors that can contribute to improved lifestyle in Nigeria. Thus, government strategy in promoting consumer protection should be more geared towards showing the health hazards of commodities. Similar results were found for other more developed economies by Pischas and Gerstetter (2017). This will have more impact on consumer education in the country.

In Table 7, the decompositions of government health expenditure show that prevention of death is a major aspect of government spending on health sector in Nigeria. This is demonstrated by the large proportions of the decomposition of government heath expenditure (*geh*) that was explained by mortality rate. The explained proportion was up to 39.03 percent in the 10th quarter. The same applies to government health expenditure being motivated by the desire to improve consumer protection in Nigeria. This is also shown by the large proportion of government health decomposition that was explained by CCI in Table 7.

5.0 Summary, Conclusion and Recommendations

In this study, the empirical relationship among trade, consumer protection and public health in Nigeria was examined. This was predicated on the view that international trade and consumer protection both have pronounced effect on public health (well-being) of the populace. In the study, public health was considered as both life expectancy and child mortality which measured both the positives and negatives of the health of citizens in Nigeria. In the same vein, consumer protection was taken as the indicator of consumer confidence index in Nigeria. In order to provide a robust analysis, a dynamic estimation structure was used for the analysis, using the VECM technique. Data for the study covered the period 2009-2020 (quarterly data). The results from the study showed that consumer protection has a very strong effect on public health in Nigeria. This effect is felt through reduction in mortality rates and increase in life expectancy in the country. Moreover, government expenditure was shown to exert very effective and positive impact on public health in Nigeria. Rising income per capital was also demonstrated to have the ability of promoting overall public health among Nigerian citizens, especially in the long run.

The results from the study present certain areas for policy recommendations. First, proactive government policies on consumer protection should be directed towards the health sector through increased sensitization on healthy living as well as dangers of certain lifestyles. There should also be increased surveillance with respect to the use of drugs and other treatment patterns among the Nigerian health sector practitioners. Indeed, there is need for sound institutional and regulatory mechanisms with respect to consumer protection. Moreover, there is need for increased and prioritized spending on the health sector, judicious use of resources expended on death-related.

In the same vein, since spending from the public sector have been shown as quite relevant in improving the health sector in Nigeria, policies aimed at improving budgetary allocations to the health sector would definitely affect health outcomes in a positive manner. Thus, even without institutional considerations, merely increasing health spending has the capacity of boosting health outcomes in Nigeria and SSA countries. Finally, since ‘health is wealth’, it invariably constitutes a critical ingredient required for a productive workforce and consequently, the rapid economic growth of Nigeria.

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CLIMATE CHANGE AND AGRICULTURE: DEEPENING FOOD INSECURITY AND POVERTY INCIDENCE IN OVIA NORTH EAST LOCAL GOVERNMENT AREA, EDO STATE

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Abstract
Despite feat achieved in science and technology globally, agriculture still remain critical to overall growth, food security, and poverty reduction in agriculture based countries. This research aimed at unveiling the extent of food insecurity and poverty incidence as occasioned by climate change on agriculture in Ovia North East Local Government Area, Edo State Nigeria. The data for the study were captured through questionnaire administration, focus group, and interview schedule and field observation. A total of 100 respondents were interviewed from 12 major communities that make up the local government area. The research revealed that food availability has declined progressively over the years, bringing about food insecurity. Income level has declined, prices of food have increased considerably; revealing deepening poverty incidence. The study also discovered that rural-urban migration is on the increase in the area. The study recommends climate change adaptive measures: changes in planting and harvest dates, tillage and rotation practices, cultivation of extreme weather resistant species, increased fertilizer usage and pesticides application. That government should provide farmers with incentives, subsidies and insurances as these will enhance agricultural activities and reduce impact of climate change in the area.

Keywords: Climate change, agriculture, food insecurity, poverty

JEL Codes: D13, Q12, Q18, Q54

1.0 Introduction
Agriculture is the basic activity by which humans live and survive on the earth. Assessing the impacts of climate change on agriculture is a vital task. In both developed and developing countries, the influence of climate change on crops and livestock as well as its impact on poverty prevalence among farmers, persist despite irrigation, improved plant and animal hybrids and the growing use of chemical fertilizers.

Climate change through extreme temperature, frequent flooding and drought and increased salinity of water used for irrigation, has become a recurrent subject of debate globally including Nigeria (Adams, 2015). Ovia North East Local Government Area, Edo State, Nigeria; is highly vulnerable to climate change due to its geographical location in

the tropical wet- and dry climate and the strong dependence of its population rain – fed agriculture.

Rainfall variability, land degradation, massive invasion by Fulani herdsmen and marauding bandits of farm lands and forests, as well as desertification, are some of the factors that combine to make life extremely difficult in this part of the world. Like in most African countries, agriculture is an important sector in this area given its multiple roles in food security, employment and contribution to the National Gross Domestic Products (GDPs) (Agbola and Ojeleye, 2007, FAO, 2005).

In Nigeria (Ovia North East Local Government Area, Edo State), there is high level of food insecurity, poverty situation in precarious, not only in terms of income poverty, but also in terms of food poverty. Agriculture is critical to achieving food security and poverty reduction as it is still the single most important productive sector in lowest income countries, often in terms of its share of Gross Domestic Product and almost in terms of the number of people it employs (IDA, 2009).

Questions from the Core of this Research

- Has an extreme climatic element any effect on food availability?
- Has climatic elements variation any effect on food prices in the area?
- Are there any observable changes in your incomes over the years?
- Have you observed any effects of extent of temperature and rainfall patterns on facilities related to food production?
- What can be done to curb the impact of climate change on agriculture, food insecurity and poverty incidence in the area?

Climate change and agriculture, food insecurity and poverty incidence have been in the front burner of global debate and discuss over the past decades. However, tackling these monsters effectively has become increasingly difficult.The aim of the research is to examine the impact of climate change on agricultural activities and its role in the prevalence of food insecurity and poverty incidence in Ovia North East Local Government Area of Edo State.

2.0 Literature Review

Conceptual Review

Climate changes are many and varied probably because the concept is a mixture of language used by geographers and environmentalist. According to the United Nations Framework Convention on Climate Change UNFCC (2000), climate change refers to change of climate that is attributed directly or indirectly to human activity that alters the composition of the atmosphere, and that is in addition to natural climatic variability observed in the comparatively recent time periods.

Intergovernmental panel on climate change IPCC (2000) defines climate change as the variation in the earth's global climate or in regional climates over time. It describes changes in the variability of the atmosphere over time scales ranging from decades to millions of years. Climate change is the global phenomenon of climate transformation characterized by the changes in the usual climate of the planet (regarding temperature, precipitation and wind) that are specially caused by human activities. As a result of

unbalancing the weather of the earth, the sustainability of the planet's ecosystems is under threat as well as the future of humankind and the stability of the global economy. Galvin (2009) defines climate change as the long – term shifts in temperatures and weather patterns. These shifts may be natural, such as through variations in the solar cycle. But since the 1800s, human activities have been the main driver of climate change primarily due to burning fossil fuels like coal, oil and gas. Burning of fossil fuel generates greenhouse gas emissions that are causing climate change. These include carbondioxide (CO_2), methane, nitrous oxide, fluorinated gases etc.

UN framework convention on climate change and the Paris Agreement (2021) reported that 2011 to 2020 was the warmest decade recorded, with global average temperature reaching 1.1^{o}C above pre-industrial levels in 2019. Human induced global warming is presently increasing at a rate of 0.2^{o}C per decade. Therefore the consequences of climate change now include among others, intense droughts water scarcity, severe fires, rising sea levels, flooding, melting polar ice, catastrophic storms and declining biodiversity.

Climate Change on Agriculture

Agricultural crops, cropping systems and other agricultural activities have been developed for, and adapted to varied regimes of climate, soil, diseases and pests. And these include cassava, sugar cane, rice sorghum, groundnut, yam, sweet potato, maize, wheat,soya beans and other fruits and vegetables which humankind depends on for livelihood and survival.

Acocket. al. (1985) argues that the basis of any understanding of climate impacts on agriculture lie the biophysical sciences. The rate of most biophysical processes are highly dependent on climate variables such as radiation, temperature and moisture, that vary regionally. According to Acock, numerous studies have explained the impacts of past climatic variations on agriculture using case studies, statistical analyses and simulation models (e.g Nix 1985, Pary 1978, Thompson 1975; World meteorological organization 1979). These studies clearly demonstrated the sensitivity of temperature and tropical agricultural systems and nations to climatic variations and changes. In the temperate regions in North America and Russia, have been of particular concern because of their effects on World Food Security. In the tropics (Nigeria) drought impacts on agriculture and resulting food shortages have been widely studied especially when associated with the failure of the monsoon in Asia or the rains in Sudano-Sahelian Africa. In the temperate regions, climatic variations are associated economic disruptions; in the tropics, droughts bring famine and widespread social unrest (Adams, 2015).

Agriculture in Nigeria is a branch of the economy in Nigeria, providing employment for about 35% of the population. FAO (2019) reported that agriculture remains the foundation of the Nigerian economy despite the presence oil in the country. Lale (2019) defined agriculture as the science, art, or practice of cultivating the soil, producing crops and raising livestock and in varying degrees the preparation and marketing of the resulting products. Agriculture also entails processing, packaging, buying and selling of agricultural products, creating conditions for the fulfillment of agricultural potential, which include accumulation of knowledge and availability of technology as well as the allocation of inputs and outputs.

Food insecurity exists when people are undernourished as a result of the physical unavailability of food, their lack of social or economic access to adequate food. Food insecure people are those whose food intake falls below their minimum energy requirements as well as those who exhibit physical symptoms caused by energy and nutrient deficiencies, resulting from an inadequate or unbalanced diet or from the body's inability to use food effectively because of infection or disease (Lale, 2019). According to FAO (2000) Food insecurity refers to the consequences of inadequate consumption of nutritious food, considering the physiological use of food by the body as being within the domain of nutrition and health.

Food Insecurity in Nigeria

Food security is indispensable prerequisite for the survival of mankind and his economic activities including food production.

According to FAO (2010) Food insecurity refers to the consequences of adequate consumption of nutritious food considering the physiological use of food by the body as being within the domain of nutrition and health malnourishment also leads to poor health; hence individuals fail to provide for their families. If left unaddressed, hunger sets in motion an array of outcomes that perpetuate malnutrition, reduce ability of adults to work and to give birth to healthy children and erode children's ability to learn and live productive healthy and happy life. Thus truncation of human development undermines a country's potential for economic growth and development.

Famine and hunger are both rooted in food insecurity. Food insecurity can be categorized as either chronic or transitory. Chronic food insecurity translate into high degree of vulnerability to famine and hunger. This is commons among the majority in developing countries especially Nigeria.

Lale (2019) considering food insecurity in Nigeria: way forward argued that gender inequality, where women are relegated in active agriculture ; has been the enhancement of hunger and farming leading to chronic food insecurity in Nigeria. He posited that policy inconsistency and corruption led to the dismal performance of some of the past agricultural programmes; such as Operation Feed the Nation, Green Revolution, River Basin Development Authority, Directorate of Foods, Roads and Rural Infrastructure among others. He also reported that poverty and hunger prevent people from working hard to increase productivity, ethnic and religious conflicts, as well as natural disasters amid low level of agricultural produce, bring about chronic food insecurity in Nigeria.

The term poverty is best described then defined. CBN (1997) described poverty as a state where an individual is neither able to cater adequately for his/her basic needs of food, clothing and shelter, nor meet social and economic obligations, such as a result of lack of gainful employment, skills, assets and self-esteems. A poor person has limited access to social and economic infrastructure such as health portable water, and sanitation, and consequently has limited chance of advancing his/her welfare to the limit of his/her capabilities.

UNFCC (2021) noted that poverty has various manifestations, including lack of income and productive resources sufficient to ensure suitable livelihood; other include hunger

and malnutrition, ill health, limited or lack of access to education and other basic services, increased morbidity and mortality from illness, homelessness inadequate, unsafe and degraded environment and social discrimination and exclusion.

Two basic concepts of poverty are usually recognized. These are absolute poverty and relative poverty. Absolute poverty refers to a condition under which there is a serious deficiency in or lack of access to basic necessities of life. Relative poverty relates to the condition of an individual house hold group or community when considered against some reference standard or parameter (Ukwu, 2002).

Poverty Incidence in Nigeria

Agriculture is critical to achieving a global poverty reduction targets. It is still the single most important productive sector in most low-income countries often in terms of its shares of Gross Domestic Products and almost always in terms of the number of people it employs.

It was reported by Bello et al., (2009) that poverty was minimal in Nigeria between 1960s and early 1970s. This was due to the steady growth in per capita income as the agricultural, industrial and the public sectors absorbed most of the labour force. The beginning of real poverty in Nigeria was in the late 1970s to early 1980s, when oil prices began to fall in 1982 and per capita income and private consumption dropped. For instance, the poverty level stood at 43% between 1985 and 1986 but rose to 54%, 61% and 66% in 1996, 1997 and 1999 respectively (CBN, 2003 in Bello et al., 2009). National Bureau of Statistics reported a decline in poverty incidence to 54.4 % but later grew to 69% in 2010 (Oyekale and Oyekale, 2013). According to Nnadi et al., (2013) the incidence of poverty has been high and increasing since 1980 in Nigeria. Empirical studies have shown that Nigeria, a Sub-Saharan African country has at least half of its population living in abject poverty.

Poverty in Nigeria is concentrated in rural areas, which are home to more than 70% of the nationals poor. Development indicators for rural areas, lag behind those for urban area: incomes are lower, infant mortality rates are higher, life expectancy is shorter, illiteracy is more widespread, malnutrition is more prevalent, and greater proportions of people lack access to clean water and improved sanitation services (Taigas and Ehuri, 2006).

Nigeria has already overtaken India as the country with the largest number of extreme poor in early 2018, and Democratic Republic the Congo could soon take over the number 2 spot. At the end of 2018, Nigeria had about 87 million people living in extreme poverty, compared with India's 73 million. What is more, extreme poverty in Nigeria is growing by six people every minute, while poverty in India continues to fall. Trajectory shows there will probably be more people living in extreme poverty in the future than today in Nigeria (World Data Lab, 2018).

Already, Africans account for about two-thirds of the world's extreme poor. If current trends persist, they will account for nine-tenths by 2030. Fourteen out of 18 countries in the world – where the number of extreme poor is rising are in Africa.

Empirical Review

Ubachukwu (2005) and Efe (2009) studied the threat of climate change to food security and livelihood in selected states of Nigeria. Their findings showed that climate change posed adverse effects on food productivity in Nigeria. The studies showed that climate change significantly impacts all aspects of crop yields, availability of seeds, and access and utilisation of foods. They noted that there were decreases in crop yields due to decreases in temperatures in the study areas and that most of the farmers had low levels of awareness of the dangers of climate change.

Food security is both directly and indirectly linked to climate change. Any alteration in climatic parameters, such as temperature and humidity that govern crop growth, has a direct impact on the quantity of food produced. Indirect linkage pertains to catastrophic events like floods and droughts, which are projected to multiply as a consequence of climate change, leading to huge crop loss and leaving large patches of arable land unfit for cultivation and hence threatening food security. The net impact of food security will depend on the exposure to global environmental change and the capacity to cope with and recover from global environmental change. At a global level, increasingly unpredictable weather patterns will lead to a fall in agricultural production and higher food prices, leading to food insecurity, which can be treated as an indicator to assess vulnerability to extreme events and slow-onset changes. This impact of global warming has significant consequences for agricultural production and trade of developing countries, as well as an increased risk of hunger. The number of people suffering from chronic hunger has increased from under 800 million in 1996 to over 1 billion recently. United Nations population data and projections (UNDP, 2009) show the global population reaching 9.1 billion by 2050, an increase of 32 per cent from 2010.

Osakhede et al. (2016) noted that climate change had constituted a great threat to rural and urban socio-economic landscapes as well as the implementation of scientific findings towards the advancement of community development in Nigeria and other African countries. It is shaping the natural landscape in the long run and the modern plan for rural and urban social and economic environments. This, unfortunately, has become a new reality with harmful effects. Many elements of the environment in the urban and rural and human society are sensitive to climate variability and change. Examples of climate-sensitive systems are ecosystems, agriculture, water needs and supply, and food production, among others.

Odejimi and Ozor (2019) use the Ordinary Least Square technique for the period of 1981–2017 to reveal that the impact climate change has, on agricultural production, a positive relationship with government expenditure, exchange rate, rainfall and agricultural output while a negative relationship with temperature and inflation.

3.0 Methodology

Study Area

Ovia North East Local Government Area is located on the coordinates of longitude 5^0 42^l and 6^0 11^l East of the Greenwich Meridian and latitude 6^0 40^l and 7^0 13^1 North of the equator. It is located in Edo south senatorial district. To the north, of shares boundary with Owan West Local Government Area, and to the east, it maintains boundary with Uhunmwonde Local Government Area, And to the west, it maintains boundary with Ovia

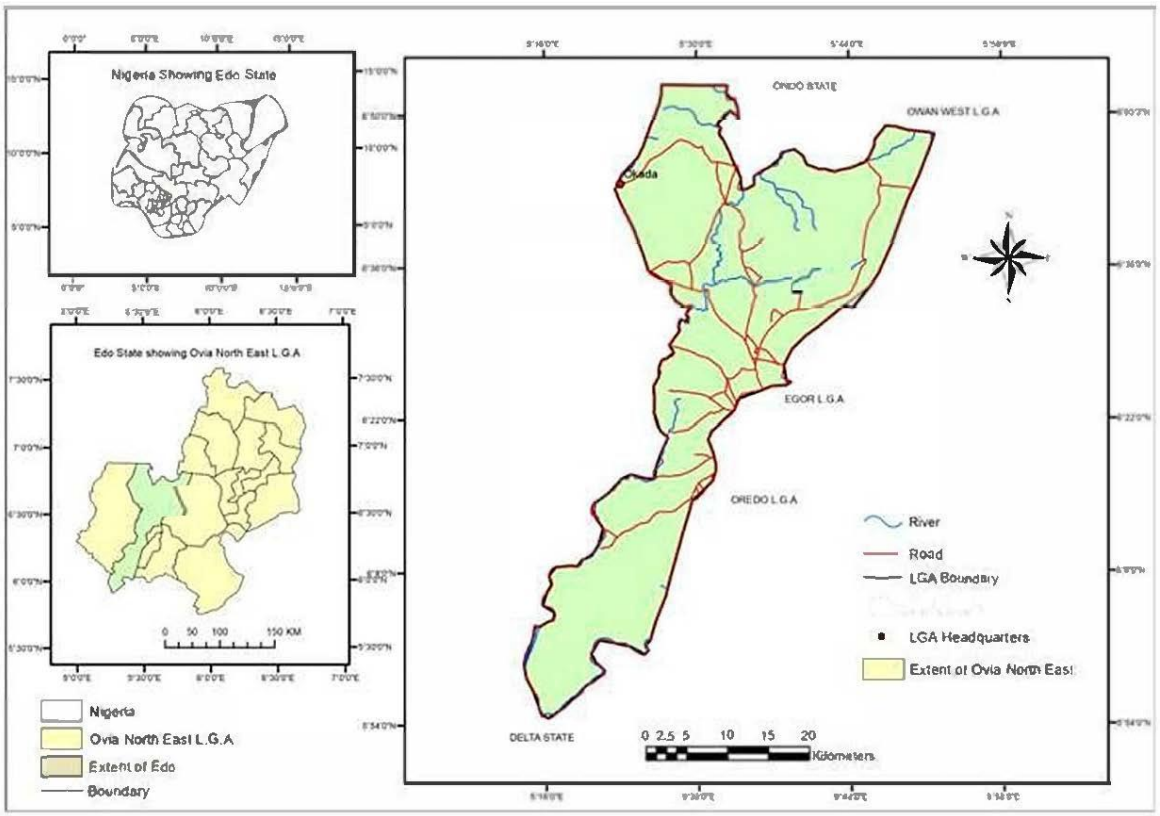
south west Local Government Area, while to the south, it shares boundary withEgor and Oredo Local Government Areas. Located on both highly, valley and lowland terrains, Ovia North East Local Government Area has a landmass of 2,301km^2 (Ministry of Land and Survey, Benin City). It has a population of 153,849 (NPC, 2006). It has its headquarters at Okada.

The climate of the area is tropical climate; there are however two marked seasons. The wet season, characterized by two rainfall maximum in the months of March to July and September to October with August break in between. And also dry season, which spans from November to March every year.

The vegetation, is tropical climate rainforest vegetation characterized by high forest; evergreen rainforest. But due to man's activities, through farming, logging, grazing, burning, some areas have developed secondary forests. The original rainforest are still being found in some communities such as Ugbogwi, Ogbese,Odighi, Utese, Igbogo, Igbanikaka,Okunuvbe, Omaminicamp, Odiguetue, Ugbokun, Ughoton etc. The local government area is drained mainly by river Ovia with many smaller tributaries.

The people of the area are predominantly farmers; with the area housing a university, a polytechnic, a college of education, secondary and primary schools, a teaching hospital, health centres, police stations and Edo state NYSC orientation camp. Other tertiary activities such as saw mills, electrical , mechanics, barbing, fashion design, banking, transport, weaving, pottery, blacksmithing etc are also found in the area.

Fig. 1 Map of Edo State Showing Study Area



Several approaches that helped to captured the required data for the research were utilized. They include structured questionnaire, focus group discussions, interview schedule, and field observation.The data were collected from 100 villages located in 12 main communities.

Table 1 Sampled Communities

S/N	Main community	No of villages	Sample size	%
1	Okada	26	12	12
2	Uhen	11	8	8
3	Uhiere	12	8	8
4	Okokhuo	05	8	8
5	Ofunmwengbe	08	8	8
6	Isiuwa	06	8	8
7	Adolor	05	8	8
8	Oluku	07	8	8
9	Iguoshodin	08	8	8
10	Utoka	06	8	8
11	Oghede	11	8	8
12	Oduna	12	8	8
Total	12	117	100	100

Source: Author's field survey, 2022.

General Stakeholders of the Area

1. Agricultural stakeholders of the areas include: Farmers, Loggers / sawmillers, Hunters, Fishermen/ women, Agricultural extension staff of the L.G.A.
2. Agricultural Activities of the Area include: Farming, Logging /sawmills, Hunting, Fishing, Non –timber products / fruits gathering, Agricultural products marketing.
3. Crops Cultivated in the Area include: Cocoa, Cassava, Yam, Maize, Plantain, Cocoyam, Fruits, Vegetables.

Selection of Respondents: Household heads were selected and interviewed for appropriate responses. Random sampling was employed to select household heads for questionnaire administration.

Oral Testimony/ Focus Group: Structured interviews and focus group discussions were used to collect information from the agricultural stakeholders in the area

.

Use of Structured Questionnaire: The questionnaire was also used to elicit information from youth groups, opinion leaders, marketers and agricultural extension staff of the local government council.

4.0 Discussion of Results and Findings

Climate change and agriculture as well as the associated socio-economic challenges have been observed noted and are being discussed and tackled worldwide. The incidence and

prevalence in Ovia North East Local Government Area of Edo state, as reveled by this research; have been presentedand discussed in tables below.

Table 2: Food Availability over the Years

	Frequency	Percentage	Valid percentage	Cumulative percentage
Quantity increasing	10	10	10	10
Quantity decreasing	70	70	70	70
Quantity is steady	15	15	15	15
No response	5	5	5	5
Total	100	100	100	100

Source: Author's field survey 2022

Table 2 shows that 10% of the respondents are of the view that food availability is increasing, 70% claimed that food availability is decreasing, 15% still claims that food availability is steady, while 5% gave no answer, i.e I don't know.

Table 3: Effect of Climate Change on Prices of Food

	Frequency	Percentage	Valid percentage	Cumulative percentage
Increased	80	80	80	80
Reduced	17	17	17	17
No response	3	3	3	3
Total	100	100	100	100

Source: Author's field survey 2022

On the issue of the effect of climate change on the prices of food, 80% claimed it has led to the increase of food prices, 17% are of the view that it has reduced the prices 3% did not answer the question.

Although there is no general census on the direction changes will be in the future in terms of climatic elements, extremes in the form of dry spells and flood are now more frequent, putting and additional pressure on already stressed system. This has induced a decline in crop production, particularly cassava, maize plantain, cocoa, yam, cocoyam and other farm produce. Causing a doubling of food prices. The combined effects of lower production on farming household, higher prices on the consumers' access to food, coupled with the increasing activities of Fulani herdsmen in the area, has raised the risk of food insecurity and hunger in the study area.

Table 4: Income Availability over the Years

	Frequency	Percentage	Valid percentage	Cumulative percentage
Income increasing	15	15	15	15
Income decreasing	75	75	75	75
Income-steady	8	8	8	8
No response	2	2	2	2response
Total	100	100	100	100

Source: Author's field survey 2022

Response to income availability over the years shows that 15% claimed that income is increasing, 75% claimed that income is decreasing, 8% said that income is steady while 2% had answer.

It is generally evaluated and believed that increasing output in any productive sector will generate increasing income and vice versa. From tables 4, the average income of the people of the area, has been on the decline. Income generally determines the standard of living of an individual. Consequently, poverty incidence is deepening among the people of the study area.

Table 5: Effects of Temperature and Rainfall Patterns on Facilities Related to Food Production (Road, Storage and Pricing/Marketing)

	Frequency	Percentage	Valid percentage	Cumulative percentage
Severe	50	50	50	50
Moderate	35	35	35	35
Lightly severe	5	5	5	5
Not severe	10	10	10	10
Total	100	100	100	100

Source: Author's field survey 2022

From table 5, irregularities in rainfall and temperature patterns have affected facilities related to food production, 50 respondents have claimed that it has sever effect on- road, storage and pricing of the agricultural produces, 35 and 5 respondents; claimed that theaffect is moderate and lightly severe respectively.

The research has shown that climate change has impacted on food security and poverty incidence has deepened among the people of the study area.

Climate change scenario in the area has led to general decline in agricultural production, reduction of food availability, increasing prices of food, diminishing incomes levels and

deepening poverty incidences among the people. The research has also discovered that the population of famers and other agricultural value chain workers have reduced as migration to Benin City and other neighbouring urban centres, is on the increase. This scenario; the research has discovered; is occasioned by food insecurity, increasing food prices, continuous decline in incomes and unabated massive invasion and killings by the Fulanis (Odigueekie, Ogbese, Odighi, Okokhuo and other communities) in recent times. In light of the above, the researcher recommends climate change adaptive measure : changes in planting and harvest dates, tillage and rotation practices, substitution of crops varieties or species more appropriate to the changing climate regimes, increased fertilizer or pesticide applications. Government should provide the farmers with agricultural extension activities, incentives, subsidies, regulations and provision of insurance. The government should also improve the security situation in the area.

5.0 Summary, Conclusion and Recommendations

This study examined the impact of climate change on agricultural activities and its role in the prevalence of food insecurity and poverty incidence in Ovia North East Local Government Area of Edo State. Household heads were selected and interviewed for appropriate responses. Random sampling was employed to select household heads for questionnaire administration. Also Structured interviews and focus group discussions were used to collect information from the agricultural stakeholders in the area while the questionnaire was also used to elicit information from youth groups, opinion leaders, marketers and agricultural extension staff of the local government council.The research revealed that food availability has declined progressively over the years, bringing about food insecurity. Income level has declined, prices of food have increased considerably; revealing deepening poverty incidence. The study also discovered that rural-urban migration is on the increase in the area. The study recommends climate change adaptive measures: changes in planting and harvest dates, tillage and rotation practices, cultivation of extreme weather resistant species, increased fertilizer usage and pesticides application. That government should provide farmers with incentives, subsidies and insurances as these will enhance agricultural activities and reduce impact of climate change in the area.

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THE EFFECT OF INFRASTRUCTURAL DEFICIENCY ON INDUSTRIAL OUTPUT IN NIGERIA

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Abstract

This study examined the effects of infrastructure on industrial output in Nigeria from 1992 to 2020. Annual time-series data and Fully Modified Ordinary Least Squares (FMOLS) estimation techniques were used to investigate the relationships between the variables. The study showed that the coefficient of electricity supply (LEEIS) is positive and statistically insignificant on Industrial output (LINDOT) during the study period. More so, government spending on transport and communication is negatively related and statistically significant at a 5 per cent level on industrial output. The coefficient of government expenditure on education (LGXED) is negative and statistically insignificant, suggesting that the government of Nigeria has not allocated enough funds to the educational sector. The results revealed that government spending on the health sector (LGXHE) is positive and significant in the model. Lastly, the coefficient of the exchange rate (EXR) is positive and significant at a 5% level during the study period. The study recommended taking immediate action to maintain and upgrade Nigeria's power grid to ensure a better supply of electricity. It was also recommended that money set aside for infrastructure improvement be closely monitored to ensure the project for which it was designated is carried out.

Key words: Infrastructural Development, Industrial output, Electricity supply, FMOLS.

JEL Codes: A1, E24, F52

1.0 Introduction

An economy with a sophisticated infrastructure is thought to be driven by its industrial sector. Production procedures and career advantages might not be optimised in the absence of suitable water, power, transportation, and communication infrastructure. Additionally, the existence of adequate and well-organised infrastructure supports both the quick growth of the economy and the enhancement of people's quality of life (African Development Bank, 2018b). Infrastructure development refers to the improvement in the basic physical and organisational structures and facilities, such as buildings, roads, and power supplies, needed for a society or enterprise. Therefore, these basic physical and organisational structures and facilities are called infrastructures. Accordingly, by international standards, infrastructural development entails the provision, building, upgrading, and rehabilitation of capital and productive projects like roads, clean water, sanitation, airports, hospitals, educational and research institutions, power development, human resources development, and improved security, among others (Akekere, *et al.*, 2017).

For the African continent to promote economic development and progress, as well as to improve the welfare of its citizens, infrastructure development is essential. Significant progress is made toward achieving the Sustainable Development Goals, reducing poverty, and advancing human development (African Development Bank,2018a). Because of this, both developed and developing nations view industrialisation as a key factor in growth and development. From the standpoint of the distribution of resources, such as production inputs and outputs, to and from the industry, the relationship between infrastructure and industrialisation in any economy may be understood. Development economists have long held that physical infrastructure is a prerequisite for industrialisation and economic development. To achieve sustainable development in any economy, infrastructure and industrialisation are essential (Umofia *et al.*, 2018).

A vast gap and significant barrier to rapid industrialisation have been established in Africa as a result of infrastructure investments not keeping up with demand growth. According to the Programme for Infrastructure Development in Africa (PIDA) framework, the continent will need to invest $360 billion in infrastructure between 2011 and 2040, with $7.5 billion of that amount going toward priority projects. To achieve these aims and bring about the kind of radical industrial transformation required to compete with equivalents in the first world, current levels of infrastructural investment are insufficient (Aladejana, *et al*., 2021).

Most economies throughout the world are currently deeply concerned with the topic of the relationship between infrastructure and industrialisation, which has become historically increasingly prevalent (Nigeria inclusive). The necessity for a workable infrastructure plan that will aid in addressing the pervasive poverty, unemployment, crime rates, and unemployed has long been claimed as being necessary for developing countries (like Nigeria) to progress and close the gap with the developed world. To accomplish sustainable economic development, the model must simultaneously foster wealth creation, industrialisation, and expansion of Small and Medium Sized Enterprises (SMEs), as well as value reorientation and environmental preservation Department for International Development (DFID), 2019.

According to a story in the May 2021 issue of Blueprint Newspaper, Nigeria has had a substantial infrastructure deficit over the years, and filling this gap could cost $3 trillion over the following 30 years. To accomplish the goal, the federal government would have to consistently spend the whole $13.58 trillion budget for 2021 during the following century. The fact that less than $3 trillion was allocated for capital construction demonstrates how urgently infrastructure spending has to be increased. Unfortunately, Bank and other Financial Institution Act (BOFIA, 2020), reported showed that the federal government of Nigeria's financial situation has left little opportunity for infrastructure development, a necessary expense for a developing country like Nigeria. Additionally, statistical data shows that capital expenditures have increased in size, for instance, from #653.61 billion in 2016 to the estimated sums of #1,242.30 billion, #1682.1 billion, #2,289.00 billion, #1,614.89 billion in 2017, 2018, 2019, and 2020, respectively, and 0.64 per cent to Gross Domestic Product (GDP) in 2016 to 1.08 per cent, 1.30 per cent, 1.57 per cent, and 1.05 per cent, respectively (CBN, 2020). Regarding the increase in allocation, however, the amount set aside for infrastructure is negligible; as a result, the spread of industrialisation is severely threatened by this infrastructure gap since industries can only flourish in an economy with reliable infrastructure.

2.0 The Statement of the Problem

Nigeria has had slow infrastructure development over the years, which has hampered its ability to industrialise. With inadequate action, successive governments have held several discussions about the development of infrastructure and presented numerous major project ideas. Although they are the product of their sector, infrastructure facilities are viewed as intermediate inputs in the manufacturing process. In addition to reducing input costs, their availability in sufficient quantity and quality boosts profitability for industries. Additionally, a lack of infrastructure might impede industrialisation by reducing the profitability of contemporary sector manufacturing. Public transportation, telecommunication, and healthcare facilities are neglected, and there are several problems with the power supply and telecommunications networks.

The evidence also appears to show that Nigeria's industrial sector has not grown particularly quickly or at a level that is encouraging in terms of capacity utilisation. For instance, according to statistical data from the World Bank, Nigeria's industrial output increased from $32.85 billion in 2017 to $38.32 billion, $51.63 billion, and $54.76 billion in 2018, 2019, and 2020, respectively, with a GDP ratio of 8.74 per cent in 2017 and 9.65 per cent, 11.52 per cent, and 12.67 per cent. According to the World Development Indicator WDI (2020), which measures development in lower-middle income countries worldwide, Nigeria's industry has made some progress over the years but is still far behind Pakistan (17.72 per cent), India (23.5per cent), and Indonesia (38.3per cent). The lack of adequate infrastructure is a major factor in this setback. Nigeria's population is anticipated to rise from its current estimate of 190 million people to over 330 million during the next 23 years, or by more than 70%. (Aladejana, *et al*., 2021). Nigeria would surpass China, India, and the United States of America in terms of population by 2040 if current trends continue. The pace of unemployment and the rate of poverty would continue to rise at a geometric rate unless significant improvements are made to Nigeria's fundamental physical infrastructure that can spur industrialisation.

The relationship between infrastructure and industrialisation, however, has been the subject of extensive investigation. For instance, studies carried out in advanced economies by Josaphat & Oliver (2000), Pineda & Rodriguez (2006), Mamatzakis (2007), Fedderke & Bogetic (2009), and Fingleton & Gomez-Antonio (2009) had varied results and their conclusions could not be generalised to Nigeria. Apart from the fact that the data only spanned a short period, the level of advancement in infrastructural development is also far compared to that of Nigeria. Additionally, there are several discrepancies in the few studies conducted in Nigeria, including those by Simon-Oke (2018), Orji, *et al*. (2018), Isikal & Chimezie (2016), and Bimba, *et al* (2020), which have led to a mixed conclusion as well. These discrepancies include the omission of critical variables, the consistency of parameters, and others. Moreover, the effect of infrastructural deficiency on industrial output has not been seriously considered in the literature. Hence, this study seeks to fill the gap in the literature.

3.0 Literature Review:

This section discusses the relevant theory and recent empirical studies on infrastructure and industrialisation.

Empirical reviews

The most recent empirical research on the relationship between infrastructure and industrial output was examined. Ogunlana *et al.* (2016) examined how infrastructure investment, both public and private, affected economic growth in Nigeria from 1970 to 2014. The study used the co-integration and error correction mechanism (ECM) proposed by Engel-Granger in 1987. The results demonstrated that infrastructural elements contribute favourably to Nigeria's economic expansion. Negative correlations were found between domestic infrastructure spending, labour force, and economic growth. Isiksal & Chimezee (2016) also examine the connections between Nigeria's GDP, industry, agriculture, and services sector (SV). The findings showed that GDP has a very strong positive link with the three sectors of industry, agriculture, and services.

The impact of infrastructure on the industrial performance of the Nigerian economy was examined by Umofia et al. in 2016. The findings demonstrated that Nigeria's industry value-added was positively and significantly impacted by federal government investment in capital creation.

Mesagan & Ezeji (2016) investigated the effect of social infrastructure on the manufacturing industry in Nigeria. The findings indicated that Nigeria's manufacturing performance benefited from teledensity. Additionally, the growth of government spending on capital projects and education had a negligible negative impact on manufacturing value added, whereas the growth of government spending on health, the production and consumption of electricity, the rate of inflation, and prime lending had negligible positive impacts. Ehizuelen (2016) looked at the dynamic relationships between infrastructural development and economic expansion in Nigeria. The study has demonstrated that infrastructure is a real sector intermediary good and service for consumer-facing final goods and services. Therefore, infrastructure needs to receive high-quality and sufficient attention if the real sector, which is the growth engine, is to drive Nigerian growth and development.

The relationship between Nigeria's industrial sector and public infrastructure investment was investigated by Akekere, *et al*. (2017). The empirical findings showed that, on the one hand, the public capital infrastructure development index, human capital development as measured by the human development index, and inflation rate are negatively related to the growth of the industrial sector in Nigeria. On the other hand, infrastructure has a detrimental effect on the growth of the industrial sector. This outcome demonstrates that infrastructure quality or availability had little impact on industrial expansion.

With data covering the years 1985 and 2015, Simon-Oke (2018) used the co-integration and error correction mechanism (ECM) to analyse the relationship between infrastructure and industrial development in Nigeria. The study concluded that long-term investments in both hard- and soft-core infrastructure would have a significant positive impact on the level of industrial development in the nation, the availability of a skilled labour force, and an increase in the average life expectancy of Nigerians.

In particular, Ubi, *et al*. (2019) look at how industrialisation in Nigeria has affected the provision of power and educational opportunities, the impulse response and variance decomposition results have ultimately confirmed that the predominant sources of fluctuations in industrialisation in Nigeria are due largely to own shocks and a lesser extent to electricity. Additionally, electricity supply and education do not contain any reliable data about industrial activity and do not exhibit a stable and predictable relationship with industrialisation in Nigeria. This may be due to these infrastructure sectors receiving a small financial allocation, which has diminished their importance in forecasting Nigeria's industrialisation level.

Using a panel data set of 17 nations covering the years 2003 to 2018, Azolibe & Okonkwo (2020) investigated whether the level of infrastructural development in Sub-Saharan Africa increases industrial sector productivity. The study's findings suggest that the quality and quantity of telecommunications infrastructure in Sub-Saharan Africa is the main factor influencing industrial productivity in that region. Analysis reveals that Sub-Saharan Africa's comparatively low level of industrial sector productivity is mostly a result of its subpar transportation, electrical, and water supply infrastructures, as well as its underutilisation. To analyse the impact on the industrial sector in Sub-Saharan Africa, the study also used the four primary indicators of infrastructure in an economy, which are electrical infrastructure, telecommunication infrastructure, water supply and sanitation infrastructure.

In Lagos State, Fagbohunka & Oladehinde (2021) looked into how infrastructure facilities affected industrial growth. While ANOVA, Stepwise Regression, and correlation were employed to test the research hypothesis, descriptive statistics were utilised to examine the data acquired. According to the research, infrastructure has a minimal effect on R&D while having a moderately substantial effect on production efficiency. The study's use of stepwise regression found that the main areas of industrial development that were favourably impacted were ease of production (89.7%), productivity (1.1%), and industrial expansion (1.5%) whereas research and development and employee morale were not significantly impacted.

Aladejana *et al*.2022 examined government spending on rail transportation and economic performance in Nigeria from 1986 to 2020. The results demonstrated that government expenditure on rail transportation (GSRT) throughout the research period had a somewhat positive impact on real gross domestic product (RGDP). In particular, government expenditure on communications (GSC) and foreign direct investment (FDI) had favourable and notable effects on the real gross domestic product (RGDP), whereas population growth (GRP) had an unfavourable effect.

4.0 Research method

Model Specification

The Simon-Oke (2018) model was used in Nigeria and modified as follows based on a study of the theory and empirical analysis.

$$IND = f(GXED, GXHE, GXTC, EEIS, EXR) -(i)$$

Mathematically, therefore, the equation (ii) is modified and presented thus: -

$$LINDOT = \beta_0 + \beta_1 LGXED + \beta_2 LGXHE + \beta_3 LGXTC + \beta_4 LEEIS + \beta_5 EXR + \mu_t - - - -(iii)$$

Whereas, INDOT= Industrial output, GXED = Government expenditure on education, GXHE = Government expenditure on health, GXTC = Government expenditure on transportation & communication, EEIS, electricity supply to industry, EXR = exchange rate and μ_t = Error terms

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ = the coefficient of the dependent variables, and β_0 = Constant;

The ***a priori* expectation** of the equation (iii) coefficients is as follows:

$\beta_1>0,\ \beta_2>0,\ \beta_3>0,\ \beta_4>0,\ \beta_5<0$

Except for the inflation rate, the a priori intercept and slope of the coefficients are predicted to have positive signs under normal circumstances.

Data and Sources

The study is based on annual Nigeria country-level data obtained from the World Bank 2020, Central Bank of Nigeria statistical bulletin and the National Bureau of Statistics of Nigeria which spanned from 1992 to 2020. The study applied fully modified ordinary least square (FMOLS) techniques to investigate the effects of infrastructure on industrial output in Nigeria.

5.0 Presentation and Analysis of Results

Descriptive statistics

Table 1: Descriptive Statistics Result

	LINDOT	LEEIS	LGXED	LGXHE	LGXTC	EXR
Mean	8.636234	5.510673	4.371909	3.665894	2.364434	111.0003
Median	8.964709	5.488524	4.779275	4.131217	2.918577	100.5191
Maximum	10.68122	5.973810	6.385934	5.961951	4.500120	272.9303
Minimum	5.833816	4.984976	-1.233408	-1.896049	-0.808566	49.73505
Std. Dev.	1.418314	0.196062	1.750174	1.954333	1.488392	50.54443
Skewness	-0.370431	-0.178552	-1.220117	-0.945322	-0.808566	1.816507

Kurtosis	2.009490	3.753005	4.619778	3.341680	2.340371	6.011265
Jarque-Bera	1.848733	0.839235	10.36559	4.460301	3.158471	26.90537
Probability	0.396783	0.657298	0.005612	0.107512	0.206030	0.000001
Sum	250.4508	159.8095	126.7854	106.3109	68.56857	3219.008
Sum Sq.Dev.	56.32524	1.076327	85.76709	106.9437	62.02870	71532.71
Observations	29	29	29	29	29	29

Source: Researcher's Computation, (2022).

Almost all variables, except exchange rate (EXR), have closed values for measures of central tendencies, with a larger difference between mean and median values. The closed mean and median values of industrial output (LINDOT), electricity supply (LEEIS), government expenditure on education (LGXED), government expenditure on the health sector (LGXHE), and government expenditure on the transport and communication sector (LGXTC) are due to the small range values (maximum minus minimum value) and standard deviation values.

The standard deviation value, or the amount by which the data deviates from the mean, reveals the range of the data. It is clear from the descriptive result that the exchange rate's standard deviation value (50.54443) indicates that it is significantly below the median values and far from the mean. This suggests that the variable has not displayed a high level of volatility over time, and has instead ranged from extremely low to very high value.

When comparing the maximum and minimum values of LINDOT, LEEIS, LGXED, LGXHE, and LGXTC, it can be seen that there are only minor variances. For instance, the maximum and minimum LGXTC values, 4.50 per cent and -0.81per cent, respectively, reveal that LGXTC has not exceeded per cent over the years under consideration. The exchange rate, though, indicates a consistent decline over the years, from #49.74 in 1992 to #272.93 in 2020.

Preliminary Test

Test of Stationarity

Table 2. Results of Unit Root Test at Level and first difference, using ADF

Test at Level				Test at a first-level difference		
Variable	Test Statistic	5% Critical Value	Level	Test Statistics	5% Critical Value	Level
LINDOT	-1.851328	-2.971853	I(0) *	-3.890225	-2.976263	I (1) **
LEEIS	-3.467156	-2.971853	I(0)**	-5.623850	-2.981038	I (1) **
LGXED	-4.204376	-2.971853	I(0) **	-13.34302	-2.976263	I (1) **
LGXHE	-5.954735	-2.998064	I(0)**	-13.97301	-2.976263	I (1) **
LGXTC	-2.199367	-2.971853	I(0)*	-7.648811	-2.976263	I (1) **
EXR	-2.642760	-2.971853	I(0)*	-4.957810	-2.976263	I (1) **
*Where; ** indicates Stationary; * Non-stationarity*						

Source: Researcher's Compilation (2022)

As shown in Table 2, the LEEIS LGXED and LGXHE data series were stationary at a level I (0)**, as the 5 per cent critical value greater than ADF the test (t-Statistic) in the model for the period of 1992-2020. In contrast, LINDOT, LGXTC, and EXR were not stationary at the level I(0)*, indicating they have a unit root problem because their t-statistics are less than the critical values at the content level of significance in More so, LINDOT, LEEIS, LGXED, LGXHE, LGXTC and EXR were stationary at first difference i.e., 1(1)**, since its t-statistics were greater than critical values at a 5% level of significance in absolute term. This implied that the variables remained stationary inside the model throughout the study, as indicated by the unit root test.

Results for Co-Integration Test

Table 3 Empirical Results of Unrestricted Co-integration Rank Test (Trace)

Trace Max-Eingen Statistics				Max-Eingen Statistics		
H_0	Trace Stat	Critical value 5%	Prob**	Max-Eingen Stat	Critical value 5%	Prob**
r= 0	156.7359	95.75366	0.0000**	60.45354	40.07757	0.0001**
r= 1	96.28235	69.81889	0.0001**	37.54578	33.87687	0.0174**
r= 2	58.73657	47.85613	0.0034**	28.26459	27.58434	0.0409**
r= 3	30.47197	29.79707	0.0418**	14.61603	21.13162	0.3167
r= 4	15.85594	15.49471	0.0441**	9.537509	14.26460	0.2441
r= 5	6.318435	3.841466	0.0119**	6.318435	3.841466	0.0119**
*Trace test indicates 6 co-integrating eqn (s) at the 0.05 level * denotes rejection of the hypothesis at the 0.05 level.*						

Source: Researcher's Compilation (2022)

Using the unrestricted co-integration rank test (trace) and Max-Eingen statistics, Table 3 above showed that industrial output, government expenditure on electricity supply, government expenditure on education, government expenditure on health, government expenditure on transportation and communication, and exchange rate in Nigeria were co-integrated in the model. It is hypothesised that there is no co-integration among the variables, according to the test statistic. As a result, the variables were jointly included in the model for the Nigerian research period.

Regression Results of Fully Modified Ordinary Least Square (FMOLS)

Table 4 Empirical Results of FM-OLS Technique

Dependent Variable: LINDOT				
Variable	**Coefficient**	**Std. Error**	**T-statistics**	**Prob.**
C	4.469109	1.515144	2.949626	0.0074
LEEIS	0.278493	0.247798	1.123871	0.2732
LGXED	-0.463861	0.302159	-1.535155	0.1390
LGXHE	1.250148	0.284334	4.396764	0.0002**

LGXTC	-0.132452	0.071444	-1.853941	0.0772**
EXR	0.003756	0.000982	3.825465	0.0009**
R-squared 0.956980 Adjusted R-squared 0.947203				

Significant at 10 % (*); 5 % (**) levels.
Source: **Author's Computation, 2022**

Table 4 above demonstrates the outstanding goodness of fit statistics with an adjusted R^2 value of 0.96, which was highly significant and it suggested that over 96 per cent of the systematic changes in industrial production (LINDOT) in the short run were captured by the selected variables. In contrast to a priori expectations, the LEEIS coefficient was observed to be 0.278493, and the prob value of 0.2732 indicated positive and statistically insignificant at 5% during the study period. According to this, there will be a 10% increase in LINDOT for every unit increase in LEEIS. This may be due to Nigeria's inadequate energy supply, and the results are consistent with those of Nsikan *et al*. (2018) and Orji *et al*. (2018). The outcome also demonstrated that LGXED and LINDOT have a negative relationship that is statistically insignificant. Poor funding for the educational system in comparison to worldwide standards was the cause of this performance. The coefficient of LGXHE revealed a positive and statistically significant value of 5% due to the government's capacity to budget and spend a sizable amount of money on the health sector, which in turn has a favourable impact on the growth of human capital. This result is consistent with that of Kareem *et al*., (2017) in Nigeria and Kosibei (2013) in Kenya. Additionally, the outcome showed that LGXTC's coefficient is negatively associated with LINDOT and statistically significant at a 5 per cent level. This implied that industrial output in Nigeria would decline by around -0.132452 if government spending on transportation and communications rose by 1%. Last but not least, empirical findings demonstrated that EXR was statistically significant in Nigeria and exhibited a positive association in the model. The constant value is found to be 4.469109 positive if all explanatory factors are taken out of the estimated model. This indicates that for the anticipated years 1992 to 2020, the intercept value ($\propto_0$) is positive.

Post-Diagnostic Test
Table 5 Wald Test

Test Statistic	Value	df	Prob.
F-statistic	7225.113	(6,22)	0.0000
Chi-square	43350.68	6	0.0000

Source: Researcher's computation (2022)

The Wald test is employed to ascertain whether all of the independent variables affect the dependent variable. According to the F Statistic, which has a value of 7225.113 and a probability value of 0.0000, the probability value (0.0000) is less than the 0.005 thresholds of significance. It may be claimed that all of the independent variables interacted to affect the dependent variable.

Normality Test

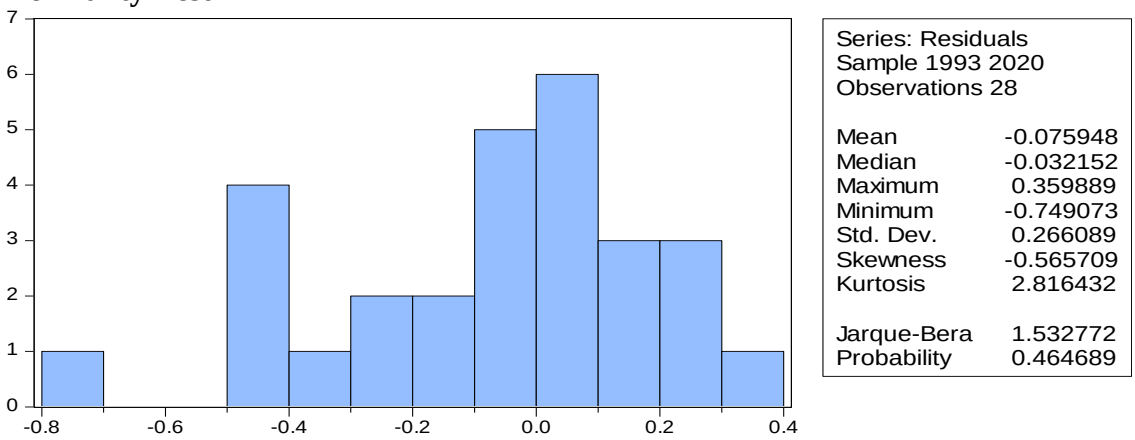

Figure 1 depicted the model's normal test. The p-value for the Jarque-Bera is 1.5327, which corresponds to a p-value of 0.465. The fact that the p-value is higher than the 0.05 level of significance leads to the conclusion that there is no problem with the residual's normality.

5.0 Summary, Conclusion and Recommendations

This study sought to respond to the key research question, “Does infrastructure improve or decrease industrial output in Nigeria?" using annual country-level data for Nigeria from 1992 to 2020. The study examined how Nigerian infrastructure affects the dynamics of industrial output using the fully modified ordinary least square (FMOLS) estimation technique. LEEIS was shown to be positive and statistically insignificant during the period of the investigation. Furthermore, the analysis found that during the study period, government spending on education (LGXED) had a negative and statistically insignificant relationship with industrial production (LINDOT). Finally, the findings revealed that, during the study period, there was a negative and statistically significant association between government spending on transportation and communication (LGXTC) and industrial production (LINDOT) at a level of 5%.

The report makes the following recommendations to remedy the severe industrial sector malfunction brought on by the infrastructural deficit in the nation: The nation's infrastructure has to be developed and maintained as a top government priority. With this action, a promise of improved industrial performance for the country can be realized. The government must start planning and carrying out the anticipated investment in the infrastructure amenities that would eventually increase industrial output. To assure a better supply of power, major steps must be taken to modernize and maintain Nigeria's power system. To promote levels of industrial performance, it was also suggested that money set aside for infrastructure development be watched to make sure the project for which it was earmarked is carried out.

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COMMERCIAL BANK CREDIT, AGRICULTURAL OUTPUT AND ECONOMIC GROWTH IN NIGERIA

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Abstract

The study examined the impact of commercial bank credit, agricultural output on economic growth in Nigeria. In doing this, the study employed commercial bank credit, agricultural output, government expenditure, inflation and interest rate to investigate this relationship by employing the ARDL bounds test approach to cointegration and error correction for analysis of annual time series data spanning the period from 1985 to 2021. The study found that agricultural output contributes significantly to economic growth in the country. This is not unexpected considering that Nigeria is a developing country which relies on agricultural production as one of its major sources of revenue to finance expenditure in capital projects. High inflation rate will adversely affect economic growth in the country in the long run. Based on the findings from the study, it was observed that bank credit has impacted adversely on the growth of the Nigerian economy. The study reveals a significant long run relationship between agricultural output and economic growth. This study suggests the need for government to promote the development of the agricultural sector through economic policies and finances. This will no doubt create more employment opportunities for the teaming unemployed population, provide more investment opportunities, increase non-oil export, improve external reserve leading to favourable foreign exchange conditions and improved economic growth for the country. The observed positive and significant impact of government expenditure on economic growth in Nigeria clearly shows the relevance of government spending in Nigeria. Thus, government should ensure that its fiscal operations are channeled towards productive uses. The monetary authorities should endeavor to deploy appropriate monetary policy instruments to bring inflation under check as it adversely affects economic growth in the long run in Nigeria

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Keywords: Commercial Bank Credit, Agricultural Output, Economic Growth, Autoregressive Distributed Lag Model, Bank Credit.

JEL Codes: C22, C51, E27, H63, H81

1.0 Introduction

The first and most successful vocation of humans is agriculture. It has evolved greatly from its first stages of harvesting wild fruits, leaves, roots, snails, insects, and going on hunts and fishing expeditions to its modern, mechanical, nearly automated state. The cultivation of land, the raising of animals for the purpose of producing food for humans, animal feed, and raw materials for our industries are all considered to be parts of agriculture. Crop production, forestry living stocks, and fishing are also included (Charles, 2015). Agriculture is necessary for the expansion of employment

opportunities, the elimination of poverty and the betterment of the income distribution, the acceleration of industrialization, and the relief of the pressure from balance of payments imbalance (Stephen, 2016).

In addition to providing food for the teeming population of the economy, agriculture is the most dominant sector and a significant source of livelihood for its citizens. This is because it is the only source of raw materials that other sectors look out for before their production can begin. Additionally, the rearing of animals provides agro-allied products for industrial growth and development, employment opportunities, particularly for the rural population, a market for the industrial sector, and the crucial link between the traditional and modern sectors. This ensures food security and thereby stimulates the growth of the entire economy.

According to Udih (2014), bank loans and advances are anticipated to encourage agricultural projects to be entirely supported by banks, which will lead to an excess of food supply and draw in new investors to the system. Consequently, if banks and the government put in place enough lending facilities, substantial and significant agricultural productivity that can advance citizen welfare can be ensured. A thorough determination of the agriculture and manufacturing sectors should be prioritized to supplement the income generated through the oil sector, as Nigeria is not only endowed with oil natural resources but also with agriculture product. Banks charge farmers excessive interest rates knowing full well that they will not be able to pay them back, according to Obilor's (2013) observation that deposit money banks favor credit and advances to their sectors other than the agricultural sector.

However, the Federal government attempted to close the gap by creating warrants versus risk in agricultural financing under the Agricultural Credit Guarantee Scheme (ACGS) (Sunny, 2013) However, despite farmers' best efforts to produce, a lack of funding makes it difficult to deliver goods to customers in a timely manner for sale. This is one of Nigerian agriculture's challenges. In order to buy more land, buy his inputs at the right moment, and pay for hired labor and farm equipment, the farmer needs the fund (Nnamocha, 2015). Unfortunately, most farmers find it difficult to obtain credit due to the collateral and other paperwork that commercial banks and other credit institutions typically need. Due to this, the majority of Nigerian farmers are unable to obtain the capital they need to invest in large-scale agriculture. This is why recent agricultural productivity has been low (Oni, 2013).

The nation has implemented numerous policies to enable financial institutions to provide loans to rural microbusiness owners (Mohammed, 2005). To increase credit flow to rural areas, agricultural banks and schemes were introduced in Nigeria . These banks and schemes include the Agricultural Credit Guarantee Scheme (ACGS), which was established in 1977, the Rural Banking Scheme (RBS), and the Nigeria Agricultural and Cooperative Banks (NACB), which were all established in 1972. The RBS was formed to encourage better banking practices among rural residents, whilst the NACB was founded to provide financing to the agricultural industry. By offering a guarantee against the danger of default, ACGS was created to encourage banks to boost their lending to the agricultural sector. In order to create services similar to ACGS but for large-scale commercial agriculture in Nigeria, Commercial Agricultural Credit

Schemes (CACS) was also introduced in 2009. Programs like Operation Go Back to Land and others were implemented at various periods to increase the productivity of the agricultural sector in Nigeria in addition to the plan and the banks formed in favor of the sector. Reviving and developing the agriculture sector to satisfy the demands of the Nigerian economy and export was also one of the main strategies of the Structural Adjustment Programme (SAP), which was adopted in Nigeria in 1986. Agribusiness eco-system development was the goal of the 2010-implemented Agricultural Transformation Agenda (ATA), which was executed in addition to the Agricultural Promotion Policy (APP) (Agricultural Promotion Policy (APP). The government implemented all these measures and initiatives to promote agriculture in order to diversify the economy and lessen its overdependence on oil (Daneji, 2011).

The dividing nature of the sector, however, seems to persist, making people doubt the role of the financial system in providing credit to the agricultural sector in Nigeria despite the focus and significant investments made in the agricultural sector by various governments to support the needs of farmers (Udoka, Mbat & Duke, 2016). Despite these measures, studies have indicated that micro and small-scale farmers obtain a significant amount of their cash needs from unofficial sources rather than formal financial institutions like banks, including money lenders, family, and friends (Mohammed, 2005 cited in Amali, 2007). In light of this, the study project sought to determine how commercial bank credits in Nigeria affected agricultural yields. This is done to shed additional light on the efficacy of commercial banks' lending to Nigeria's agriculture sector.

Numerous research in this field, including Enyim, Ewno, and Okoro (2013), have identified a lack of loan availability as one of the causes influencing Nigeria's agricultural sector's subpar performance. Banks specifically provide business finance, according to Obilor (2013). The Agricultural Guarantee Scheme (ACGS), which offers protection against inherent risk in agricultural management, was developed by the Central Banks of Nigeria to encourage banks. Due to the labour- and capital-intensive nature of agricultural loans, this initiative was unable to accomplish its intended goals (Nwankwo, 2013). Hence the research delved into this study in search for probable solution.

The main objective of this study is to find out how much bank loans contributed to Nigeria's agricultural output between 1985 and 2021. Other objectives include to:

- Determine the effect of commercial bank loan on economic growth in Nigeria is one of the study's particular goals.
- To ascertain the effect of agricultural output on Nigeria's economic expansion.
- To ascertain the association between interest rates and economic growth in Nigeria.
- To determine whether government spending affects the country's economic expansion.

Hypothesis of Research

The null and alternative hypotheses listed below will serve as the study's guiding principles;

$H0_1$: Holds that there is no discernible connection between the credit provided by commercial banks and Nigeria's economic expansion.
$H0_2$: States that there is no discernible connection between government spending and Nigeria's economic expansion.
$H0_3$: States that interest rates and economic growth in Nigeria do not significantly correlate.
$H0_4$: States that in Nigeria, there is no significant and positive correlation between agricultural output and economic growth.

The study is divided into five sections and they are- the introduction, review of literature, methodology, data analysis and finally the summary, recommendations, and conclusion.

2.0 Literature Review

This section reviews the theoretical and empirical literature that are pertinent to the topic being studied in order to determine which key variables should be included in the empirical model.

2.1 Theoretical Literature

2.1.1 Theory of Interest

The Classical Theory of Interest Rate: The intersection of the investment demand and saving schedules, or the schedule revealing how investments and saves respond to interest rates, yields the interest rate. The Keynesians criticized this theory, claiming it is indeterminate (it cannot be solved), yet there is no solution because the position of the saving schedule will fluctuate with the level of real income. We are unable to predict what the rate of interest will signify by the higher volume of investment and, consequently, by way of the multipliers, a high level of real income when income rises since the saving schedule will move to the right. Therefore, the traditional theory is unable to offer a solution.

Keynes' Interest Theory of Liquidity Preference: Keynes describes the rate of interest as the benefit for distributing liquidity for the predetermined period rather than keeping it. The need for resources to invest and the willingness to refrain from spending are brought into balance by other factors than pricing. The price is what balances the need to hold wealth in the form of cash with the amount of cash that is actually available. In other words, according to Keynes, the supply and demand for money determine the rate of interest. As opposed to the real theory of classical economics, this theory is referred to as the monetary theory of interest.

Loanable Fund's Theory: The loanable fund theory, which is frequently used to explain interest rate movement, was developed in the 1930s by British economist Dennis Robertson and Swedish economist Bertil Ohlin. It postulates that the market interest rate is determined by the factors that control the supply of and demand for loanable funds. The idea is particularly helpful for understanding changes in the average interest rate for a given nation. The phrase "demand for loanable funds" is widely used in financial markets to refer to the borrowing activities of households, businesses, and governments. It can also be used in conjunction with other concepts to explain why interest rates on some debt securities of a given country vary. Households frequently

request loanable money to pay for housing expenses. Additionally, they fund the acquisition of vehicles and household goods, resulting in installment debt.

Financial Intermediation Theory: Credit is a crucial component of financial intermediation because it gives money to businesses that can use it most effectively. The link between financial intermediation and economic growth has been demonstrated by theoretical investigations. Financial progress can result in explosive expansion, as noted by Greenwood and Jovanovich in 1990. According to a related study, the rise of banks and effective financial intermediation promote economic expansion by directing savings toward high-productivity activities and lowering liquidity risks. As a result, they came to the conclusion that financial intermediation promotes growth (Odejimi & Agbada 2014).

Theory of the Bank Lending Channel: According to the bank lending channel, changes in the supply of intermediated credit, particularly loans from commercial banks, are caused by monetary policy and have an impact on the external finance premium. It suggested that bank-dependent borrowers might not necessarily be cut off if the supply of bank loans is disrupted for some reason, but they might have to pay for finding lenders elsewhere.

2.1.2 Economic Growth Theories

Neoclassical Growth Model: The basis for the Neo-Classical Growth theory is the work of Solow and Swan (1956), which is an expansion of the 1946 Harrod-Domar model. Solow (1956) asserted that labor, capital, and technology are factors in economic growth. According to the idea, a transitory equilibrium can be reached by adjusting the proportions of labor, capital, and technology in the economy, neglecting the potential contribution of finance to economic growth. According to Solow (1956), economic growth is independent of the economy's saving and investment rates, and capital investments made as a result of higher savings only result in temporary growth because capital is subject to diminishing returns in a closed economy with a fixed supply of labor and no technological advancement. According to Solow (1956), sustainable economic development can only be attained by technological advancement.

Endogenous Growth Model: The body of work that criticized the Neo-Classical Model of Growth makes up the Endogenous Growth Model. It implies that endogenous rather than exogenous influences control economic growth. The hypothesis contains two components in this regard, one that believes that investments in innovation, knowledge, and human capital greatly influence economic growth, and the other that focuses on externalities and beneficial spillover effects that can spur economic growth. The importance of financial intermediation in creating economic growth lies at the heart of this idea. In this context, a number of scholars, including Levine (1997), Bencivenga and Smith (1991), and Saint-Paul (1992), have included the financial system's influence on economic growth in the Endogenous Growth Model.

In order to encourage savers to make investments in profitable ventures that can spur economic growth, Smith's (1991) main focus is on the effective financial intermediation that results when liquidity risk is properly controlled. According to Saint-Paul (1992), a well-established and functional stock market can spur economic growth by

encouraging businesspeople to share risk. Levine (1997) places more emphasis on the significance of stock markets in generating the necessary financing for investment goals, particularly in less liquid assets, much like Saint-Paul (1992) did.

2.2 Empirical Review

The results of the literature on the relationship between commercial bank loan and increases in agricultural output are conflicting. According to some scholars, credit increases agricultural output. Others believe that since growth is one of the variables that affects the availability of credit, credit follows growth. Ammani (2012) examined the impact of credit on Nigerian agriculture using the OLS method. It was found that formal credit has a positive and significant relationship with the productivity of the agricultural, livestock, and fishing sectors. The long- and short-term relationships between credit and agricultural output were not, however, looked at in this study.

The Olagunju and Babatunde (2001) study on agricultural financing in Nigeria was confirmed by Adetiloye (2012), and it concluded that lending to the agricultural sector is essential but noted that credit supply has not been expanding with the economy. Using time series data and a nonlinear autoregressive distributed lag (NARDL) model, Kufre (2002) examines the connection between credit to agriculture and agricultural output in Nigeria. The findings indicate that there is no evidence of an asymmetry in the short run between the positive and negative effects of credit on production growth in the agricultural sector, but there are different equilibrium connections in the long run. The dynamic adjustments demonstrate that, with a lag of four quarters of the forecast horizon, the influence of the positive improvements in credit to agriculture is primarily what drives the cumulative agricultural output growth.

The relationship between agricultural finance and economic growth in Nigeria is examined by Aladejana (2004). The analysis used time-series data that covered the years 1986 to 2008 from the Central Bank of Nigeria, Statistical Bulletin, and National Bureau of Statistics. To analyze the variables, this study used the Auto-Regressive Distributed Lag (ARDL) method. The results demonstrated that there was a short-term and long-term association between agricultural loans and economic growth, respectively.

Mbat (2006) investigated the impact of commercial banks' credit on Nigeria's agricultural output from 1970 to 2005. Data from the Central Bank of Nigeria's statistical bulletin were used in the study. The parameter showing the associations between the explanatory variables and the agricultural production in Nigeria was estimated using the Ordinary Least Square method. The findings indicated that agricultural production in Nigeria and commercial banks' lending to the industry were positively and significantly correlated.

In Punjab, India, Sidhu *et al*. (2008) estimated the impact of institutional loans to the usage of production inputs, private investments, and agricultural growth using a simultaneous equation model. The findings indicated a highly significant correlation between the usage of variable inputs and credit disbursement, indicating that access to production inputs had an impact on agricultural output growth. In both established and emerging economies, Weiss (2010) looked into the connection between bank lending

and agricultural output. Bank credit has been shown to have a favorable effect on agricultural output by Afangideh (2010), however some have remarked that there is also a negative correlation between the two.

Simsir (2012) examined the long-term correlation in Turkey between loan expansion and agricultural growth. Credit was found to directly impact agricultural employment and revenue. Simsir (2012) found a positive link between agricultural revenue and loans using linear regression. The association between credit and agricultural output was shown to be significant at a 95% confidence level after additional analysis using the Granger-causality test. In this case, according to Odejimi and Ozor (2019) credit was found to have a one-way causal relationship that led to real agricultural revenue.

In a similar study, Tasie and Offor (2013) examined the relationship between farmers' access to credit and agricultural performance in Nigeria using South-South, Nigeria and information from the International Fund for Agricultural Development (IFAD) (River State). According to the study's findings, credit provided to farmers by IFAD policy significantly increased agricultural outputs and farmers' income in Nigeria. Taise and Offro (2013). Osabohien *et al*. (2020) used the Propensity Score Matching (PSM) model to validate the findings by Tasie and Offor (2013), and discovered that households with access to agricultural financing had yields that were three times higher than the counterfactuals.

Ogar, Nkamene and Effiong (2014) investigated the impact of commercial banks' loans, on manufacturing sectors. Secondary data, such as manufacturing output, commercial banks' loans, and commercial banks' interest rates were variables used in the study. Ordinary least square of multiple regressions was used on the models to determine the relationship between dependent variables and independent variables, their findings show that commercial banks' credits had a significant relationship with the manufacturing sector. Findings from the study also revealed that the performance of entrepreneurship is not significantly impacted by bank credits from regulated institutions to agricultural entrepreneurs.

Using an ordinary least squares method, Chinweoke, Egwu, and Nwabeke (2015) looked at the effects of commercial banks' loans and advances to Nigeria's manufacturing and agricultural sectors from 1994 to 2013. The study's findings demonstrate that lending and advances by banks to the manufacturing and agriculture sectors have a statistically significant effect on economic growth.

Using the Error Correction Mode, Nnamocha and Charles (2015) examined the impact of bank lending on agricultural output in Nigeria (ECM). The analysis made use of annual data from the Central Bank of Nigeria (1970–2013). The research revealed that there was a long-term association between all the variables and that they were all integrated of order one (1). According to the empirical results of this study, agricultural output in Nigeria was found to be significantly influenced by industrial output and bank credit over the long term, but only industrial output in the near term.

The OLS approach was used by Chandio *et al*. (2016) to analyze the impact of institutional credit distribution on Pakistan's agricultural output during a 33-year period

(1983-2015). The study's findings demonstrated that institutional credit increased agricultural output by 1.03 percentage points for every one percent rise in institutional credit disbursement, a positive and substantial relationship. The study suggested that banking institutions work toward creating straightforward security, documentation, and payment processes so that small farmers may receive financing and, as a result, increase agricultural productivity (Odejimi and Edogiawerie, 2019).

Nwokoro (2017) discovered that banks' loan had a favorable impact on agricultural GDP using OLS and the error correction model on Nigeria's 1980–2014 data. Using the Ordinary Least Square (OLS), Error correction model, Athanasius (2017) investigated the association between bank loan and agriculture sector performance in Nigeria from 1980 to 2014. According to the study, bank credit to agriculture, foreign exchange rates, government spending on agriculture, and money supply all have positive and significant relationships with agricultural gross domestic product, with the exception of interest rates, which have a negative but significant relationship.

In order to examine the connection between credit to agriculture and agricultural output in Nigeria, Nwokoro (2017), Udoka *et al*. (2016), and Olorunsola, *et al*. (2017) utilized a nonlinear autoregressive distributed lag model on a time series data from 1992 to 2015. According to the study's findings, there is no indication of an asymmetry in the short-run effects of credit on agricultural output growth, but there are different equilibrium correlations in the long run. They further emphasized the necessity for research into how much the various agricultural credit components (production, processing, and marketing) influence agricultural output.

Meressa (2017) used unbalanced short panel data (2010–2016) from 16 private commercial banks in Nigeria using random effects generalized least square (GLS) approaches. According to the study's findings, credit from private commercial banks had no statistically meaningful impact on the expansion of the agricultural industry.

Using focus group discussions (FGD) and key informant interviews (KII), Osabuohien, Okorie, and Osabohien (2018) made the case that a strong institutional framework is necessary for the efficient distribution of credit facilities to farmers who need them the most. Credit alone, in their opinion, may not be sufficient. However, active institutions make sure that the intended farmers receive finance.

In order to examine the long-term association between agricultural loan given through formal institutions and agricultural GDP, Ahmad (2018) used an autoregressive distributed lag (ARDL) bound testing approach on annual time series data from 1973 to 2014. A long-term correlation between agricultural loans and agricultural GDP was found by empirical estimation. Further empirical results showed a substantial and favorable correlation between agricultural credit and output. It has been noted that one of the main obstacles that restrict farmers' access to finance and consequently impair total agricultural productivity is lengthy formal credit procedures.

To investigate the effect of bank loan facilities on agricultural output, Adjognon (2019) used recent nationally representative data. The sources of input financing were also observed by the investigation. The findings demonstrate that bank credit has no bearing

on agricultural output and that farm input is primarily a result of farm owners' savings from non-bank sources rather than bank loans.

The effects of commercial bank lending and agricultural growth in Nigeria from 1989 to 2019 are examined by Okafor (2020). The research demonstrates that while interest rates have a negative and minor impact on agricultural output, government spending on agriculture, agricultural credit guarantee funds, and loans to the sector all have positive and significant effects. Therefore, the study draws the conclusion that commercial lending has a favorable impact on Nigerian agriculture.

3.0 Methodology

3.1 Theoretical Framework

The researcher must take into account the nature and type of the research topic when deciding which economic theory to use in the theoretical framework of an empirical investigation. The Classical Theory of Interest Rate is used as the theoretical foundation for this study. The intersection of the investment demand and saving schedules, or the schedule revealing how investments and saves respond to interest rates, yields the interest rate. Due to the fact that the position of the saving schedule will vary depending on the level of real income, however, no solution is available; for this reason, the Keynesians attacked this theory and claimed it was irrational (it cannot be solved).

We are unable to predict what the rate of interest will signify by the higher volume of investment and consequently, by way of the multipliers, a high level of real income when income rises since the saving schedule will move to the right. Therefore, the traditional theory is unable to offer a solution. A low interest rate attracts investment in or increases agricultural output because the rate of interest provided by commercial banks determines how farmers can receive loans from the commercial bank.

3.2 Model Specification

The dependent variable is Gross Domestic Product (GDP): This variable was selected because it serves as a gauge for measuring Nigeria's economic expansion. The explanatory variables are Agricultural Output (AOP), Interest Rate (INTR), Government Expenditure (GEXP), Inflation (INFL) and Commercial Bank Credit (CBC).

This is symbolically expressed as follows:

GDP = f (CBC, AOP, GEXP, INTR, INFL) ……..……(1)

The mathematical presentation of the model is shown below:

$GDP = Bo + B_1 CBC + B_2 AOP + B_3 GEXP + B_4 INTR + B_5 INFL\ Ui$ ……..(2)

Where:

GDP = Gross Domestic Product; AOP = Agricultural Output; GEXP = Government Expenditure; INTR = Interest Rate; INFL = Inflation; Bo = Constant Term; $B_1 – B_5$ are parameters to be estimated; Ui = Stochastic Error Term.

3.3 Data Sources

The entire set of data, which covers the period 1985 to 2021, was extracted from Central Bank of Nigeria Statistical Bulletin and World Bank Data. An ordinary least square (OLS) method was employed to estimate the model parameters because of the nature of the data which is times series. Other sources of data include Federal Government of

Nigeria (FGN) national account; Annual statistics digest and synopsis from the National Bureau of Statistics (NBS).

4.0 Presentation of Results and Analysis

4.1 Descriptive Statistics

Table 1. Descriptive Statistics for the variables under study

Table 1. Descriptive Statistics of Variables

	GDP	CBC	AOP	GEXP	INTR	INFL
Mean	1.762741	9.489263	23.75982	3.916679	18.61398	19.34767
Median	2.025825	8.218357	23.37165	2.123442	17.79500	12.21778
Maximum	12.45747	19.60353	36.96508	9.448340	31.65000	72.83550
Minimum	-4.457078	4.948032	18.02043	0.911235	9.433333	5.388008
Std. Dev.	3.718628	3.583752	3.946139	2.928902	4.147842	17.91300
Skewness	0.490184	1.088922	1.397431	0.634849	0.615471	1.698687
Kurtosis	3.502267	3.832576	5.556850	1.930714	4.908267	4.528878
Jarque-Bera	1.769532	7.927771	20.92525	4.018444	7.520190	20.24111
Probability	0.412811	0.018989	0.000029	0.134093	0.023282	0.000040
Sum	61.69595	332.1242	831.5938	137.0838	651.4893	677.1685
Sum Sq. Dev.	470.1587	436.6714	529.4483	291.6679	584.9562	10909.77
Observations	35	35	35	35	35	35

Source: Author's computations using Eviews 9

Within the time frame under consideration, Gross Domestic Product averaged US$1.762741 billion and fluctuated between US$12.45747 billion and -US$4.457078 billion. The series is considered to be normally distributed if the Jarque-Bera statistic coefficient has a p-value greater than 0.05. According to the Commercial Bank Credit descriptive statistics, the mean percentage for the time period under consideration was $9.49. Between 19.60 and 4.95 percent made up the series.

The Jarque-Bera statistic, however, shows that the series is not normally distributed. The skewness and kurtosis values show that the distribution is leptokurtic and positive, respectively. Within the time frame, 23.76 percent was the mean (average) agricultural output. 18.02 percent was its lowest figure, and 36.97 percent was its highest value. The series may not be normally distributed, as shown by the Jarque-Bera statistic's p-value, which is less than 0.05. The distribution is favourably skewed, as shown by the skewness value, and is peaked, as seen by the kurtosis statistic (leptokurtic). The GEXP series, which averaged 3.92 percent and varied from a maximum of 9.45 percent to a minimum of 0.91 percent, shows that government expenditure figures cover fiscal activity in the economy. The series is believed to be normally distributed if the Jarque-Bera p-value is greater than 0.05. The distribution is positively skewed, as indicated by the skewness value of 0.634849, and the kurtosis value indicates that the distribution is platykurtic (because it is smaller than 3).

Within the time frame, the average interest rate was 18.6%. It had a minimum value of 9.4% and a maximum value of 31.65 percent. The series may not be normally distributed, as shown by the Jarque-Bera statistic's p-value, which is less than 0.05. The

kurtosis and skewness statistics, however, show that the series is peaked and positive. During that time, the average inflation rate was 19.35 percent. Having a range of 5.39 percent and 72.84 percent. The series may not be normally distributed, according to the Jarque-Bera statistic's p-value. The kurtosis and skewness statistics show that the inflation series is peaked and positive, just as the interest rate series.

4.2. Correlation Analysis

The variables' pair-wise correlation coefficients are shown in Table 2. These depict how the various variable pairs are related to one another. However, they do not account for or gauge causal connections or outcomes.

Table 2. Correlation Coefficients

	GDP	CBC	AOP	GEXP	INTR	INFL
GDP	1.000000					
CBC	0.115151	1.000000				
AOP	0.746168	0.42362	1.000000			
GEXP	0.184011	0.828936	-0.167051	1.000000		
INTR	0.086133	-0.229414	0.382285	-0.337480	1.000000	
INFL	-0.345303	-0.336367	0.037735	-0.369363	0.435753	1.000000

Source: Author's computations using EVIEWS 9

All factors except inflation are positively related to GDP, as shown in Table 2, but these correlations are not very strong as evidenced by the low correlation coefficients except AOP which is 0.74. The increase /decrease in the CBC, AOP, GEXP, and INTR is related to the increase/decrease in GDP, and this implies that all the variables (apart from inflation) moved in the same direction as the GDP. An increase in INFL led to a decrease in GDP which suggests the existence of an inverse relationship. The correlation coefficients of AOP and CBC is positive but not strong.

Also, GEXP and CBC with a positive correlation of 0.83 have a strong correlation. INTR and INFL show a weak negative coefficients in relation to CBC. INTR and INFL with correlation coefficients of 0.38 and 0.04 with respect to AOP show a weak correlation. AOP and GEXP have a weak negative correlation.

4.3. Unit Root Tests

The variables were checked for unit roots to ascertain their stationarity or time-series characteristics before estimating the stated model. To choose the best method for the analysis, this test is crucial.

Table 3. Unit Root Test Results

ADF Unit Root Test Results							
	Levels			**First Difference**			
	t-stat.	Critical value (5%)	Inference	t-stat.	Critical Value (5%)	Inference	
GDP	-3.50	-1.95	S	-	-	-	0
CBC	-3.99	-3.54	S	-	-	-	0
AOP	0.05	-1.95	NS	-6.76	-1.95	S	1
GEXP	-3.08	-3.55	NS	-4.97	-3.54	S	1

INTR	-2.92	-2.94	NS	-6.46	-2.95	S	1
INFL	-2.81	-3.58	NS	-4.05	-3.60	S	1

NS = Non Stationary; S = Stationary
Source: Author's Estimation using Eviews 9.

The results of the ADF unit root tests show that there is a jumbled order of integration for the variables. While GDP (the dependent variable) and CBC are integrated of order 0 (zero), which means they are stationary at level, AOP, GEXP, INTR, and INFL are integrated of order 1, meaning they are stationary at first differences. The Autoregressive Distributed Lag (ARDL) technique is thus the most suitable method for the inquiry.

4.4. Cointegration Test

The ARDL technique to cointegration, also known as the limits testing strategy, is best suited to test the long-run relationship (or cointegration) between the variables given the fact that the variables are integrated of a different order (0, 1).

Table 4: Cointegration Test (ARDL Bounds Test) Results

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	329.4931	5

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.26	3.35
5%	2.62	3.79
2.5%	2.96	4.18
1%	3.41	4.68

K = Number of explanatory variables
Source: Author's Estimation using Eviews 9

The outcome of the cointegration test demonstrates that the dependent variable and the explanatory variables have a long-term relationship. The calculated F-statistic of 329.4931, which is higher than the upper bound critical values at the usual levels of statistical significance, serves as a sign for this. The Granger Representation Theorem states that if a long-term link between two variables exists, an error correction model may be used to describe their short-term (dynamic) relationship.

4.5. Model Estimation Results

Table 5 displays the findings from the estimation of the specified short-run (error correction) and long-run models.

Table 5: Estimation Results

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(-1))	-0.725132	0.063073	-11.496777	0.0552
D(GDP(-2))	-0.892053	0.068177	-13.084368	0.0486
D(GDP(-3))	-1.284663	0.068268	-18.817985	0.0338
D(CBC)	-1.171598	0.096461	-12.145872	0.0523
D(CBC(-1))	-0.445776	0.093955	-4.744576	0.1322
D(CBC(-2))	1.030729	0.091568	11.256435	0.0564
D(CBC(-3))	0.582495	0.082041	7.100038	0.0891
D(AOP)	1.583039	0.104575	15.137840	0.0420
D(AOP(-1))	-0.781178	0.129027	-6.054375	0.1042
D(AOP(-2))	0.424687	0.134557	3.156185	0.1953
D(AOP(-3))	0.661616	0.077793	8.504873	0.0745
D(GEXP)	-0.824220	0.130949	-6.294184	0.1003
D(GEXP(-1))	0.004849	0.144849	0.033474	0.9787
D(GEXP(-2))	-2.075952	0.086736	-23.934230	0.0266
D(GEXP(-3))	0.467133	0.116658	4.004291	0.1558
D(INTR)	1.807972	0.061241	29.522366	0.0216
D(INTR(-1))	0.575044	0.136178	4.222735	0.1480
D(INTR(-2))	-0.358739	0.091723	-3.911125	0.1594
D(INTR(-3))	-0.017846	0.058700	-0.304027	0.8121
D(INFL)	0.018483	0.031302	0.590467	0.6604
D(INFL(-1))	-0.233722	0.033960	-6.882187	0.0919
D(INFL(-2))	0.046308	0.016690	2.774554	0.2202
D(INFL(-3))	0.162684	0.011609	14.013878	0.0454
CointEq(-1)	-0.981972	0.060723	-16.171373	0.0393

Cointeq = GDP - (-3.9952*CBC + 1.6700*AOP + 3.8917*GEXP + 0.0900
*INTR -0.4112*INFL -9.3150)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CBC	-3.995241	0.308622	-12.945408	0.0491
AOP	1.670021	0.151510	11.022488	0.0576
GEXP	3.891674	0.224427	17.340513	0.0367
INTR	0.090033	0.136443	0.659854	0.6287
INFL	-0.411223	0.023831	-17.255482	0.0369
C	-9.315047	2.965823	-3.140797	0.1962

Source: Author's Estimation using E-VIEWS 9

The cointegrating form, which is the error correction model, demonstrates that in the short term, GDP is greatly impacted by its own lagged values up to the third period. At a 5 percent level, the short-term impact of EXCH on GDP is detrimental and significant. In the short run, a unit decrease in the exchange rate will result in a 0.0617 unit increase in GDP.

At a 5 percent level, the short-run contemporaneous effect of CBC on GDP is unfavourable and considerable. Short-term economic growth cannot be explained by past commercial bank credit values. A unit increase in CBC causes a 1.172 unit delay in GDP. However, it goes against a priori hypothesis that CBC would have a negative and large impact on GDP. Gross domestic product (GDP) is positively impacted by agricultural output (AOP) in the short term concurrently, and the effect is large at 5%. Government spending does not have a statistically meaningful short-term impact on GDP. This shows that throughout the time period under examination, the variable was not a significant short-run driver of GDP in the nation. Despite being important in the second lagged phase, GEXP does not conform to theory.

At a level of 5%, the contemporaneous effect of interest rates is statistically significant and positive. The favourable impact of interest rates on GDP falls short of what was anticipated a priori. Additionally, in the short run, the lagged numbers do not explain the behaviour of GDP. In the short run, inflation has little impact on GDP.

The error correction coefficient is, as one might anticipate, negatively signed and significant at the 5% level. The coefficient's absolute value shows that 98.2% of the short-run departure from equilibrium is corrected annually to bring about equilibrium.

According to the projected long-run coefficients, CBC, AOP, GEXP, and INFL are the same factors that have impact on GDP in the short run. Similar to how it does in the short term, Commercial bank Credit (CBC) has a negative impact on GDP over the long term, with effects becoming considerable at a 5 percent level; these conflicts with theoretical postulates. GDP declines by 3.995 units for every unit increase in commercial bank credit. According to a study by Sogules and Nkoro (2016), bank loans and economic growth in Nigeria have a long-run significant, but negative relationship.

The long-run effect is also favourable and significant at the 5 percent level, correlating with the positive short-run effect of agriculture output on GDP according to our findings. So, an increase in AOP will result in a 1.67-unit improvement in GDP. This outcome is consistent with Okoro's (2011) findings that agricultural output has a favourable impact on economic growth. The long-run effect is positive and significant at the 5 percent level, in contrast to the documented positive short-run effect of government spending on gross domestic product after two periods have passed. As a result, an increase of one unit in GEXP (as a percentage of GDP) will result in an increase of 3.89 units in GDP. This is consistent with the findings of Usman and Agbede (2015), who similarly discovered favourable growth effects of government spending on GDP.

Interest is positive in the short run on GDP but not statistically significant. Therefore, during the review period, interest rates were not a significant factor in Nigeria's economic growth. The short-run effect of inflation on the GDP has been seen to be positive, but the

long-run effect is negative and significant at the 5% level. Inflation will therefore cut GDP by 0.41 unit. This might be accounted for by how it affects production costs, which has a negative impact on employment and living standards. This result supports that of Iyoha and Okim (2017), who found that inflation had a negative impact on economic growth.

4.6. Model Diagnostics Tests

4.6.1 Test for Multicollinearity

The variance of the predicted coefficients of the regression model increases as a result of the multicollinearity issue. The t-ratios of the parameter estimations shrink or decrease when the variances or standard errors increase, respectively. This could result in a theory that was previously rejected being accepted. A regression model becomes biased as a result of multicollinearity, making it untrustworthy for use in making policy.

The Variance Inflation Factor (VIF) test was used to determine whether the variances of the model parameters were inflated or the estimated model was plagued by multicollinearity. The test's outcome is displayed in Table 4.6.

Table 6. Test for Multicolinearity: Variance Inflation Factor

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
GDP(-1)	0.027252	1.845782	1.505016
GDP(-2)	0.024483	1.687388	1.339174
CBC	0.072273	30.10998	3.614922
AOP	0.028125	65.80202	1.548776
GEXP	0.145344	14.22288	4.907857
INTR	0.040267	60.10017	1.996973
INTR(-1)	0.032551	48.05094	1.883495
INFL	0.001209	3.447640	1.522149
C	26.62853	104.7270	NA

Source: Author's Estimations using EVIEWS 9.

All of the centered VIFs are less than 5 according to the multicollinearity test. This suggests that the model is not impacted by the issue of substantial multicollinearity (Akinwande, Dikko & Samson, 2015). As a result, the projected parameter variances are not exaggerated.

4.6.2. Residual Normality Test

The least-squares estimator makes the assumption that the residuals are regularly distributed. The histogram approach was used to examine the accuracy of this supposition in the calculated model.

The result of the test for residual normality is presented below.

Figure 1a. **Histogram Residual Normality Test**

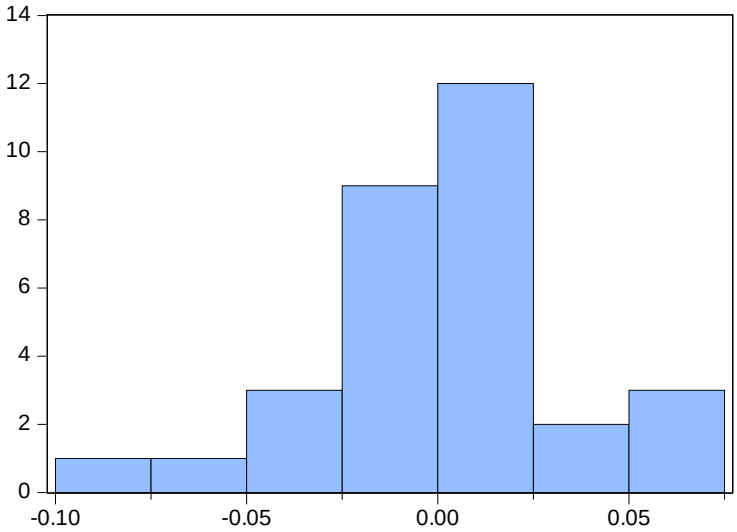

Figure 1b.

Series: Residuals	
Sample 1989 2019	
Observations 31	
Mean	-1.41e-14
Median	0.009424
Maximum	0.069079
Minimum	-0.098141
Std. Dev.	0.035849
Skewness	-0.588962
Kurtosis	3.676300
Jarque-Bera	2.382981
Probability	0.303768

The coefficient of skewness is close to zero, the kurtosis is close to three, and the p-value for the Jarque-Bera statistic is higher than 0.05, according to the summary of the descriptive statistic in Figure 1 right panel. As a result, the null hypothesis that the residuals are normally distributed is accepted, showing that this is the case.

Serial Correlation Test

This test is used to determine whether or not the underlying ARDL model residuals are correlated. The autocorrelation issue imparts some bias into the computed parameter coefficients, making them untrustworthy. The test's outcome is shown in Table 7.

Table 7: Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.151558	Prob. F(2,22)	0.8603
Obs*R-squared	0.448496	Prob. Chi-Square(2)	0.7991

Source: Author's Estimation using EVIEWS 9

The B-G-serial Correlation Test's p-value of the F-statistic fails to reject the null hypothesis of "no serial correlation" at the 5% level. This test result suggests that serial correlation in the model is substantially decreased.

Heteroskedasticity Test

This was done to check the consistency of the variances in the residuals from the regression. For this, the Breusch-Godfrey-Pagan (B-G-P) test was used. The test outcome is shown in Table 8.

Table 8. B-P-G Test for Heteroskedasticity

F-statistic	0.231566	Prob. F(29,1)	0.9533
Obs*R-squared	26.98207	Prob. Chi-Square(29)	0.5727
Scaled explained SS	0.037571	Prob. Chi-Square(29)	1.0000

Source: Author's Estimation Using Eviews 9

Given that the p-value for the F-statistic is higher than 0.05, the null hypothesis that there is no heteroskedasticity is accepted at the 5% level. Consequently, the heteroskedasticity issue is not present in the model.

Test of Hypotheses

In this subsection, the hypotheses presented in chapter one of this study will be tested. The hypotheses will be tested using the t-ratios of the calculated coefficients of the long-run model. The tests are run using a 5% threshold of significance.

$H0_1$: Commercial bank credit has no significant effect on Nigeria's economic expansion. The long-run t-ratio of the associated variable (CBC) coefficient at the 5% level does not disprove this null hypothesis. Therefore, Gross domestic Product (GDP) in Nigeria is influenced by commercial bank loans.

$H0_2$: There is no significant effect of agricultural output on Nigeria's economic growth The computed coefficient of AOP's t-ratio passes the statistical significance test at the 5% level. As a result, the null hypothesis is rejected. Over time, the gross domestic product (GDP) in Nigeria is affected by the agricultural output.

$H0_3$: Interest rate does not have effect on economic growth.
The estimated t-ratio coefficient of INTR failed to pass the test of statistical significance at the 5% level. As a result, we cannot rule out the null hypothesis that Long-term economic growth of the nation is unaffected by interest rates.

$H0_4$**:** Government spending does not have effect on Nigeria's economic growth.
The null hypothesis is rejected since the t-ratio of the coefficient of GEXP passes the test of statistical significance at the 5% level. Therefore, it could be assumed that GDP is impacted by government spending in Nigeria over time.

$H0_5$: Inflation does not impact negatively on Nigeria's economic growth.
The t-ratio shows that the inflation coefficient passes the test of statistical significance at the 5% level therefore rejecting the null hypothesis. We can conclude that GDP in Nigeria is impacted by inflation based on this research.

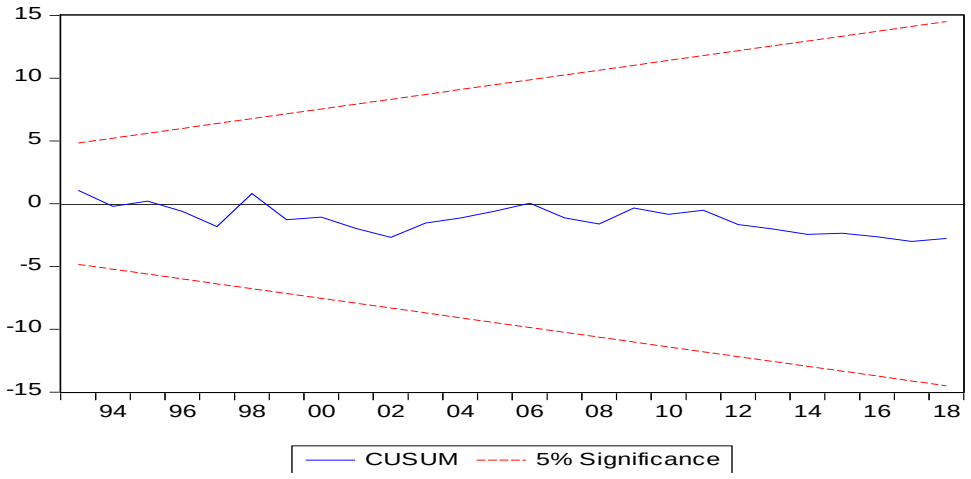

Figure 2: Cumulative Sum of Recursive Residuals

At the 5% level of significance, the CUSUM plot is within the critical boundaries. Therefore, it can be concluded that the model (in the long run) is structurally stable.

Policy Implication

The main conclusion drawn from findings of this study is that Nigeria's gross domestic product is driven by commercial bank credit and agricultural output. However, the gross domestic product (GDP) is negatively impacted by commercial bank credit. Therefore, a focus should be placed on ensuring that credits extended to persons involved in agriculture in used for the purpose. The gross domestic product is negatively impacted by the inflation rate. The policy implication is that it has an undesirable impact on employment and living standards due to its impact on production costs and prices. According to the established long-term positive relationship between government spending and gross domestic product (GDP) in Nigeria, expansionary fiscal policy is a major factor in driving economic growth since it raises the level of economic activities.

5.0 Summary, Conclusion and Recommendations

5.1 Summary of Findings

This study used empirical analysis to estimate the relationship between bank credits, agricultural output and economic growth. The argument has been that the economic possibilities for long-term growth have been significantly diminished by the declining trend in agricultural productivity and the access of credit to increase agricultural output. Econometric models were used to estimate data spanning the years 1985 to 2021. The autoregressive distributed lag (ARDL) technique and error correction analysis were used to analyze the dynamics of economic growth in Nigeria in the face of agricultural production and bank lending. The following conclusions were drawn from the empirical analysis:

That Commercial bank credit contributes to Nigeria's economic expansion, Nigeria's economic expansion is significantly boosted by agricultural output, government spending had a positive effect on economic growth in Nigeria, agriculture production is negatively affected by inflation and this in turn affects Nigeria's economic growth.

5.2 Conclusion

The study looked at how agricultural output and commercial bank lending impacted Nigeria's economic growth. The study used the ARDL bounds test approach to cointegration and error correction for analysis of annual time series data spanning the period from 1985 to 2021 in order to investigate this relationship. The variables of interest were commercial bank credit, agricultural output, government expenditure, inflation, and interest rate. According to the empirical data, Nigeria’s economy has the propensity to grow if the agricultural sector is given the needed boos Government should make efforts through the various agencies and financial institution to encourage investment in the agricultural sector.t. Nigeria as a developing country depends on agricultural production for revenue.

5.3 Recommendations

Given that agricultural output and commercial bank credit have an impact on Nigeria's economic growth, the study makes the following recommendations:

- The analysis demonstrates a strong long-term link between agricultural output and economic expansion. Therefore, government should support the growth of the agricultural industry through economic and financial measures. Without a doubt, this will expand non-oil export, provide more investment opportunities, increase employment prospects for the growing unemployed people, improve external reserves, resulting in favourable foreign exchange conditions and increased economic growth for the nation.

- The economic growth in Nigeria has been shown to have a positive and significant impact on government spending, which demonstrates the necessity of government spending in Nigeria. Therefore, the government must make sure that its financial operations are directed toward useful purposes.

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INTERNATIONAL TRADE AND ECONOMIC GROWTH IN NIGERIA

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Abstract
The study examined the impact of international trade on real gross domestic product growth for the specified period 1985-2021. The research study used secondary data obtained from various issues of the Central Bank of Nigeria (CBN) Statistical Bulletin and Annual Report and statement of Account. The study examined the nexus between trade and economic growth in Nigeria. The Autoregressive Distributed Lags (ARDL) technique and diagnostic tests were employed in the empirical analysis for the period to ensure robustness. A broad highlight from the study indicated that export, import and trade openness provide a background for analyzing economic growth in Nigeria. However, the long run effect of import was negative and not key in explaining economic growth. The results of our empirical investigation provide robust evidence that trade intensity measures are negatively associated with economic growth. For instance, trading-related investments in the economy, boosts imports via increases in income and aggregate demand. The study recommended the need for policy dimensions to adequately adjust trade openness to efficient levels. It also recommended that exports should be promoted along-side imports of technology to aid production.

Keywords: Autoregressive Distributed Lag, Economic Growth, Exports, Imports, International Trade

JEL Codes: C32, E27, H63, H81

1.0 Introduction
International trade is simply known as the exchange of goods and services between two nations. At least two countries should be involved in the activities, that is, the aggregate of activities relating to trading between merchants across borders (Owolabi, 2015). International trade through the medium of import and export of goods and services has become an increasingly important and prominent economic activity amongst countries particularly in this volatile economy. The exchange of goods and services across borders is an avenue through which countries are able to achieve and promote economic self-sustainability as well as a platform for transforming a country's natural resource into economic wealth.

The wealth acquired in this regard is used by the government to provide basic infrastructure which enhances the living standards of the populace and consequently leading to economic growth (Odediran, 2017). The positive spillover effects that international trade has on the economy of developing countries especially Africa is that it presents opportunities for local industries to internationally broaden their market reach. This results to the potential increase of market size and increased profit turnover which

in turn results to the encouragement and growth of employment opportunities for the teaming populace.

Kehinde, (2017) posited that when nations of the world engage in trade with one another, there are bound to be gains on both sides as each country increases. Its utility expands this circle of choices available to its citizens. More so, developing countries tend to benefit from the diffusion of technology that is engendered by international trade. The theory of comparative advantage make us to understand that countries trade with each other in goods and services because of the concept of differentials in the natural resources, human capital, financial capital and technical capabilities endowment and good standard of living for the citizenry (Adedeji, 2006).

The importance of international trade stems from the fact that no country can produce all goods and services which people require for their consumption largely owing differences in resource endowment and constraints. As a result, this trade relationship suggests that economies need to export goods and services in order to generate revenue to finance imported goods and services which cannot be produced domestically (Sam, 2010). International trade can be interchangeably referred to as foreign trade or global trade. It encompasses the inflow and outflow of goods and services in a country.

In an open economy, development of foreign trade greatly impact GDP growth (Chen, 2017). Countries would be limited to goods countries to goods and services produced within their territories without international trade. International trade is directly related to globalization because increase in trade activities across border is paramount to the globalization process. The globalized nature of an economy enhances its direct participation in the world market expansion. According to Adam Smith, expansion of a country's market encourages productivity inevitably lead to economic growth. Government earns revenue through international trade activities. International trade as a major factor of openness, has made an increasingly significant impact on economic growth (Heshmat, 2010). The openness of a nation influence a country's growth rate by impacting upon the level of economic activities and facilitating the transfer to resources across borders. Nigeria is basically an open economy with international transactions constituting a significant proportion of her output. In Nigeria, international trade has been found to be paramount to the growth of the economy because it generates a significant amount of revenue particularly from the agricultural and oil sectors. Prior to the discovery of crude oil, significant portion of Nigeria's revenue emanated from the exportation of agricultural product such as palm oil, groundnut, rubber and cocoa. However, the discovery of crude oil resulted to the neglect of the agricultural sector as Nigeria's major export sector.

Emehelu (2018) stated that Nigeria's economic growth is measured by gross domestic product (GDP). Therefore, GDP is perceived as a sum total of the market value of a country output of goods and services, which are exchange for money or trade in a market system over certain periods. It was observed that the gross domestic product (GDP) of Nigeria is $186 billion in 2017. This indicates that the economy is over dependence on the capital intensive oil sector, which provides 45 percent of GDP, 95 percent of foreign exchange earnings and about 65 percent of government revenue for 2017.

The broad objective of the study is to examine the impact of international trade on economic growth in Nigeria from 1985 – 2021. The specific objectives include:

(i) To examine the impact of exchange rate on real gross domestic product growth for the specified period.
(ii) To examine the impact of trade openness on real gross domestic product growth.
(iii) To examine the impact of inflation on real gross domestic product growth.

2.0 Literature Review

2.1 Theoretical Review

Theories of international trade

Theory of absolute cost advantage: This theory was postulated by Adam Smith in 1776. It emphasizes the need that a country should specialize in the production of products where they have an absolute advantage -ability to efficiently produce with minimal cost and wastage of resources with the assumption that labour is the only factor of production in the economy of the state.

Heckscher-Ohlin theory of international trade: This theory was postulated by Eli Heckscher and his student Bertil Ohlin. According to this theory, countries should export only what they can produce efficiently in excess. They further opined that international trade is determined by resource imbalances in the world and nations should take advantage of this resource imbalance to increase not just their capital base and earning but should be an opportunity to develop their region.

Theory of comparative cost advantage: This theory was postulated by David Ricardo. In his words, a nation is like a person who profits from trading activities by producing and exporting commodities they have the most comparative advantage of over its counterpart or trading partner. It further states that the nation should import those good and services in which it has the least comparative cost advantage on. In summary, this theory is geared toward ensuring countries incur least costs and get maximum benefits from its international trading activities or partnership with other nations.

The Theory of Factor Proportion: The theory of factor proportion on the other hand is capable of giving an explication for discrepancies in advantage demonstrated by trading nations. As lucubrated by the theory, nations have the tendency to produce and exchange internationally goods and services that exploit large amounts of abundant production factors that they have, while they import those that require large amounts of production factors which are comparatively and scarcely unavailable (Heckcher and Ohlin, 1933 cited in Morgan and Katsikeas, 1997). The theory fleshes out the concept of economic advantage in the context of costs of factors of production and endowment.

Theories of Economic Growth

The Harrod-Domar Growth Model: Harrod (1939) and Domar (1946) independently combined elements of both classical and Keynesian economic growth (income determination) theories such as investment, capital and incomplete markets, to develop what later came to be known as the Harrod-Domar growth model (Baldwin, 1972). This model argues that a nation's economic growth is dependent not only on its saving rates but also the extent to which it can minimize its current consumption levels. In this case economic growth is viewed as a direct consequence of a country's ability to increase both its savings and the ratio of capital to output or GDP (Ray, 2003). An illustration of this is shown in the equation below where Y represents national output (GDP), ΔY represents change in GDP, s, is savings ratio and k is capital-output ratio.

$\Delta Y/Y = s / k$

The fundamental idea behind this model is quite obvious: the more the country saves and invests a share of its Gross Domestic Production (GDP) the more it grows and vice versa. The experience of many developing countries, such as Nigeria, has rendered huge credence to the applicability of this growth model. According to Ghattak (1978), low saving rates and high current consumption levels in these LDCs have reduced GDP growth rates of these countries and hence driven them to seek financial loans and aid from abroad to cover for their acute resource deficiency. In response scholars such as Afxentiou (1993) and Khatkate (1967) have argued that foreign trade can play a significant role in addressing this problem by increasing its foreign exchange revenue from exports. These scholars posit that since a country's ability to service debt is directly proportional to its export levels and interest rates on external loans, export promotion can help to narrow the gap between the interest rates on foreign loans and foreign exchange revenue, thus improving its debt servicing position. This would accelerate long-run GDP growth in LDCs where debt servicing is one of the major obstacles to economic growth. In this Harrod-Domar model imports can also contribute to growth if a country imports capital goods and technology which can increase the country's capital stock which results in growth in GDP over time. These capital goods may be in the form of productive plant and machinery (Ghattak, 1978).

Solow Neoclassical Growth Theory: This theory is one of many extensions of the traditional neoclassical growth theory. According to Dasgupta (1998), Solow's model basically follows the neoclassical economic tradition by analyzing economic growth (Y) as occurring through a production function containing factors such as labour (L), capital (K), and the level of technology (A) is assumed to be given. More importantly, Dasgupta notes that the model assumes diminishing marginal returns of the inputs to output as shown by the elasticities of labour (β) and capital (1-β) with respect to output. This function is depicted in the formulation below.

$Y = K\beta (AL) 1- \beta$

With constant elasticity economic growth (represented by increase in productivity) is seen as resulting from changes in the factors of production. However, this productivity is also influenced by other exogenous (external) factors such as government policies, changes in technology, market concentration and human capital (Ray, 2003). This is shown the equation below.

$\Delta Y/Y = \beta (\Delta K/K) + (1- \beta) (\Delta A/A + \Delta L/L)$

According to this theory, foreign trade has a part to play in attaining economic growth. A couple of arguments have been raised in support of both the export-led growth (ELG) and import-led growth (ILG) hypotheses. Two of the staunchest supporters of the ELG, Kruegar (1978) and Dollar (1990) state that exports boost the level of a country's GDP by increasing returns to scale divisibilities and fostering competitive domestic production. In addition, foreign exchange revenue realized from exports not only shores up the country's foreign currency reserves which creates stability in the value of the domestic currency, but can also be used to service external debt and import technologies that would further raise GDP growth. From this Mwimba (2003) concluded that open economies are more likely to benefit from the ELG than closed economies because through increased returns to scale, open economies converge at higher income levels than

closed economies. Coupled with this Ram (1990) considers both exports and imports as factors of production that, if efficiently utilized, can generate increased rates of return for an economy hence increasing productivity and economies of scale.

Foreign trade as characterized by the importation of foreign technology and skills transfers also improves the effectiveness and efficiency of domestic labour and capital which enables a country to maximize its comparative advantage thereby allowing it to maximize its gains from trade which in the end increases the level of GDP (Gunter, Taylor and Yeldan 2005).

Endogenous Growth / New Growth Theory: According to Dasgupta (1998) the new growth theory or endogenous growth theory grew out of frustration with earlier neoclassical growth approaches' failure to pinpoint the causes of the massive inequalities in the levels of national income between developing and developed nations as evidenced by the emergence of the Latin American debt crisis in the early 1980s. Dasgupta states that this growth model differs sharply from the neoclassical growth theory which emphasizes the principle of diminishing marginal returns to scale of the inputs to the level of output. Instead it argues that the factors of production show constant marginal returns to productivity and capital formation.

This growth model views an increase in GDP as coming from internal production processes i.e. it endogenises growth. In addition to this, Lal (1992) argues that unlike neoclassical economic growth theories which assume technology to be a given, endogenous models argue that the level of technology in the economy emanates from international capital transfers between developed countries and LDCs (Todaro and Smith, 2009).

Empirical Review

Gemechu (2002), using co-integration and error correction approach in the regression analysis, examines the policies and test for the relationship between export and economic growth. The result shows that export significantly affected domestic product per Capital estimated around $3,500 person (Nigeria economy). Yanikkaya (2003) revealed that there is a positive and significant association between trade openness and growth. As a country opens up its economy (imports plus exports as a ratio of GDP) and participates more in international trade, it becomes integrated into the world economy and can enjoy the static and dynamic benefits accumulating from international trade.

Lin (2003) stated that ten percent increase in exports cause one percent increase in GDP in the 1990s in China on the basis of new proposed estimation method, when both direct and indirect contributions are considered. Shiraz (2004) studied the short run and long run relationship among real export, real import and economic growth on the basis of cointegration and multivariate Granger causality for the period 1960 to 2003. This study showed a long-run relationship among import, export and economic growth and found unidirectional causality from export to output but did not find any significant causality between import and export. Yanikkaya (2003) tested the relationship between trade openness and economic growth for more than 100 developed and developing countries using panel data from 1970 to 1997. The results show that openness to international trade does not have a clearly defined relationship with economic growth and the results further show that trade barriers were positively significant in association with economic growth,

especially for developing countries and the findings of theoretical economic growth were not consistent.

Gokal and Hanif (2004) argued that inflation imposes negative externalities on the economy as it affects an economy's efficiency, leads to uncertainty and affects future profitability of investment projects. Furthermore an economy's international competitiveness is also negatively affected by high inflation by reducing purchasing power of a currency, making exports relatively expensive and leading to deficits in the balance of payment.

Akanni (2007) also studied whether oil exporting countries grow as their earnings on oil rents increases, using PC-GIVE (Ordinary Least Squares Regression). The results of the study shows that there is a positive significant relationship between oil rents, investment and economic growth and it also proves that oil rents in most rich oil developing countries in Africa do not foster economic growth. Oviemuno (2007), looks at international trade as an engine of growth in developing countries taking Nigeria (1960-2003) as case study, he uses four important variables which are export/import, inflation and exchange rate. The result shows that Nigeria exports value does not act as an engine of growth in Nigeria.

In Libya, Farag (2008) aimed to identify the role foreign trade planning and extent of its contribution to raising the rates of economic development in Libya during the period (1988- 2003). The study concluded that foreign trade contributed to the growth of the gross domestic product, which depends on capital and intermediate goods and as a main source of income through exports to finance the requirements of economic development. Hawitah and Shat (2009) Utilizes a sample regression to analysis Libyan foreign trade during the period (1977-2006) to track the development of exports and imports. One of the most important findings of the study is export has a positive effect in economic growth.

Pazim (2009) tested the validity of export-led growth hypothesis in three countries by using panel data analysis. It is concluded that there is no significant relationship between the size on national income and amount of export for these countries on the basis of one-way random effect model. The panel unit root test shows that the process for both GDP and Export at first difference is not stationary while the panel co integration test indicates that there is no co integration relationship between the export and economic growth for these countries. According to Chen, (2009) taking foreign trade and other factors as independent variables to explore the relationship quantitatively between the two cannot only explain the relationship accurately, but also make the affecting extent of independent variables on dependent variables clear.

Mishra (2012) claims that empirical evidence on the nexus between imports and economic growth is rather mixed and inconclusive. If increased GDP is always the source of finance for imports then they can constrain growth and can have a negative impact on economic growth. Ajayi and Atanda (2012) empirically examined the trade and capital flow channels of globalization on macroeconomic stability as proxy by real output growth rate in Nigeria between 1970 and 2009. They utilized an autoregressive model which indicated that the first lag of real output growth rate has a significant positive effect

on real current growth rate, while the second autoregressive term is found to exert insignificant negative effect on current real output growth rate.

Olaifa, Subair and Biala (2013) empirically investigated the effect of trade liberalization on economic growth in Nigeria between 1970 and 2012 with a view to examining the possibility as a long term relationship existing between the two and also to account for the structural changes that may have occurred with the implementation of a free trade regime in 1986. Adopting the ordinary least squares in estimating the relationship, they find that there is a long run relationship between trade liberalization and economic growth in Nigeria. Strong evidence was also found to support structural changes that took place in 1986 with the use of free trade policy. However export was reported to have a negative relation to growth. The study concluded by recommending that an enabling environment that will engender further growth such as better infrastructural base, adequate financing support adherence to international best practice in export and sound institutional structure be put in place for sustainability. Abughalia and Abusalem (2013) investigated the empirical analysis on the Libyan economy and its structural changes, with special reference to Libyan foreign trade during the last three decades (1980-2010). The analysis was conducted using descriptive analytical methods and statistical tools such as linear regression analysis. The study observed that the trade process between Libya and the EU has experienced some success, leading to more economic cooperation through bilateral relations, promoting the private sector to play its role in the trade process during the period of study. Hussain and Saaed (2015) investigated the empirical relationship between export, import and economic growth in Tunisia during 1977-2012. The study revealed that there is unidirectional causality between exports and economic growth. Abubakar (2016) analyzed the relationship between international trade and economic growth in West Africa from 1991 – 2011. Based on the panel data of 16 out of 17 countries in the region, the study found that a one percent rise in export variable will lead to growth of GDP by 5.11 percent. Ogbokor (2016) investigated the macroeconomic impact of oil exports on the economy of Nigeria. Utilizing the popular OLS technique, he observed that economic growth reacted in a positive manner to oil exports as used in the study. He also found that 10% increase in oil exports would lead to 5.2% jump in economic growth. He concluded that export-oriented strategies should be given a more practical support.

Oladimeji and Muhammed (2017) investigated the effect of international business on SMEs growth in a competitive environment particularly Nigeria. It was also revealed that the exchange rate has a significant effect on SMEs growth in Nigeria, and the level at which exchange rate affects SMEs growth is relatively high. Okeowo and Aregbeshola (2018) reviewed a study on trade liberalization and performance of the Nigerian textile industry. Findings revealed that the effect of simple tariff rate on textile industry is negative and statistically significant in the long-run while trade liberalization policy measure through simple tariff rate has a lag effect before it can be effective in the textile industry. In both short and long run, real effective exchange rate depreciation worsens the performance of the textile industry in Nigeria.

Osidipe, Onuchukwu, Otto and Nenbee (2018) assessed the impact of Trade Liberalization on some selected manufacturing sectoral groups. The results of analysis led to the conclusion that trade liberalization does not have significant impact on FBT, CKM, and BM in Nigeria. FDI is positively signed and thus have direct impact on the three- sub-sectors. Omodero and Alpheaus (2019) carried out a study on the effect of

foreign debt on the economic growth of Nigeria. The regression results indicate that foreign debt exerts a significant negative influence on economic growth while foreign debt servicing has a strong and significant positive impact on economic growth. The study found that labour quality has a positive and significant effect on RGDP in line with theory. Stephen Egoro (2021) examines the effect of international trade on the economic growth of Nigeria from 1985 to 2019.

3.0 Research Methodology

3.1 Theoretical Framework

In this study, the endogenous growth theory is adopted. According to Dasgupta (1998) the new growth theory or endogenous growth theory grew out of frustration with earlier neoclassical growth approaches' failure to pinpoint the causes of the massive inequalities in the levels of national income between developing and developed nations as evidenced by the emergence of the Latin American debt crisis in the early 1980s. Dasgupta states that this growth model differs sharply from the neoclassical growth theory which emphasizes the principle of diminishing marginal returns to scale of the inputs to the level of output.

This growth model views an increase in GDP as coming from internal production processes i.e. it endogenises growth. In addition to this, Lal (1992) argues that unlike neoclassical economic growth theories which assume technology to be a given, endogenous models argue that the level of technology in the economy emanates from international capital transfers between developed countries and LDCs (Todaro and Smith, 2009). Therefore it is through these international capital movements that the role of international trade (imports and exports) becomes more pronounced. In fact LDCs exchange their export products, mainly primary commodities, for capital injections such as foreign direct investments, and technology from rich nations. For imports, the trade-growth transmission mechanism mainly involves technology.

3.2 Model Specification

The variables of the equation in the model the study intends to use are; gross domestic product per capita as the depends variable and proxy for economic growth, exchange rate, export trade, import trade, trade policy and trade openness as independent variable.

The functional relation between the variables is:

RGDP = F (EXR, EXP, IMP, TOP, FR)……1)

Transforming the variable into logarithm form, the model is modified as:

LRGDP = F(LEXR, LEXP, LIMP, LTOP, LFR)……(2)

Where: RGDP = Real Gross Domestic Product; EXR = Exchange Rate; EXP = Export Trade

Thus, the ARDL regression model is specified as:

LRGDPt = a0 + a1 LRGDPt-1 + a2 LEXRt + a3 LEXRt-1 + a4 LEXPt-2 + a5 LEXPt + a6 LEXPt-1 + a7 LEXPt-2 + a8 LIMPt + a9 LIMPt-1 + a10 LIMPt-2 + a11 LTOPt + a12 LTOTt-1 + a13 LTOPt-2 + a14 LFRt + a15 LFRt-1 a16 LFRt-2 + Gvt…….. (3)

Where a0 is the constant term, and a2 (i = 1,...., 16) are the parameters of the model.

Ut is the random error term which has to be serially independent noted that the degree of global trade openness is measured s import plus export divide by two.

Method of data analysis

This study investigates the international trade and economic growth in Nigeria using annual time- series data from 1985-2021. The data uses for the study are RGDP (Real Gross Domestic Product). EXG (Exchange Rate), EXP (Export Trade) IMP (Import Trade) TOP (Trade Openness) FS (Foreign Reserve) obtained from the Central Bank of Nigeria (CBN) Statistical Bulletin, National Bureau of Statistics and World Bank.

The study will adopt the ARDL bound testing approach to test the presence of the long run relationship between the variables of different order of integration. However, an important condition to apply ARDL is that, the series must not be 1(2). Rather, the combination of 1(0) and 1(1) should warrant the use the ARDL bound testing method. Therefore Augmented Dickey Fuller (ADF) and Philips–Perron (PP) test were conducted to determine whether the series are 1(0) or 1(1) if the hypothesis of no, co-integration is rejected, we then employ the restricted ECM model to measure the short run dynamic effect and long run equilibrium relation between the variables. In constrict, if the hypothesis of no co-integration is accepted, then unrestricted VAR should be applied.

Sources or Data Collection

The research study will rely mainly on secondary data obtained from various issues of the Central Bank of Nigeria (CBN) Statistical Bulletin and Annual Report and statement of Account as well as from the World Bank World Development Indicators (WDI) for the period 1985 – 2021.

4.0 Presentation of Results and Empirical Analysis

4.1 Descriptive Statistics

The descriptive statistics of the distribution for the variables used in the study are reported in Table 1. The Table shows the mean and other moment conditions for each of the variables.

Table 1: Descriptive Statistics for the Datasets

	RGDP	EXPT	IMP	EXRT	OPN	FR
Mean	1996.764	21.48882	15.60023	109.3183	0.021443	27210347
Median	1980.447	21.28533	14.68970	100.2596	0.008050	16185652
Maximum	2688.267	36.02327	22.81126	273.0110	0.212956	1.38E+08
Minimum	1414.101	8.829530	9.509990	49.74991	0.002207	-1194502.
Std. Dev.	476.6094	6.844535	3.768109	50.54456	0.040271	30477839
Skewness	0.068107	-0.030346	0.484177	1.821916	3.886376	2.107572
Kurtosis	1.365149	2.456374	2.127009	6.085126	18.49909	7.566888
Jarque-Bera	3.364116	0.374015	2.124780	28.49440	375.7970	48.27988
Probability	0.185991	0.829437	0.345629	0.000001	0.000000	0.000000
Sum	59902.91	644.6646	468.0070	3279.548	0.643288	8.16E+08
Sum Sq. Dev.	6587538.	1358.582	411.7606	74087.81	0.047031	2.69E+16
Observations	30	30	30	30	30	30

Source: Author's computation using Eviews 9

The descriptive statistics of the RGDP variable help to identify the place of trade in the overall performance of the economy. It is seen from the Table that GDP per capita was US$1996.764 billion on average over the period of the study. The minimum and maximum values of the growth per capita clearly indicate that its growth has fluctuated over the period within the range of US$1414.101 billion and US$2688.267 billion respectively. This instability in RGDP is further underscored by the large standard deviation value of 476.6094. The positively skewed structure of the RGDP series (at 0.068) suggests that a large chunk of the values lies to the left of the mean value. Apparently, there have been large variations in the data series for growth of income per head in the country over the years. This strong swing in RGDP have implications for trade in the economy as well as the impacts on welfare in the longer term.

In terms of the third moments of the variable distributions, we consider the J-B values for each of the series. This indicator shows the level of normality of the probability distribution. The J-B value for RGDP, EXPT and IMP variables fail the significance test at the 5 percent level which indicate that the variables are all normally distributed. This is not the case for the other variables (EXRT, OPN and FR) in the sample for this study. They reject their null hypotheses at the 5% level and conclude that their distributions are not normal.

4.2 Correlation Matrix

The initial patterns of relationship among the explanatory variables in the study are examined by considering the correlation coefficients of these variables. The correlation matrix is presented in Table 2.

Table 2: Correlation Matrix

	RGDP	EXPT	IMP	EXRT	OPN	FR
RGDP	1.000000					
EXPT	-0.402267	1.000000				
IMP	-0.143507	0.301441	1.000000			
EXRT	-0.103222	-0.101933	0.391458	1.000000		
OPN	-0.424423	0.119648	-0.167096	-0.198971	1.000000	
FR	0.644022	-0.427010	-0.150059	0.042521	-0.290326	1.000000

Source: Author's computation using Eviews 9

From table 2, all the variables are negatively correlated with RGDP except foreign reserves. This suggests that rising levels of EXPT, IMP, EXRT and OPN is associated with a reduction in RGDP. Foreign reserves move in the same direction with gross domestic product per capita. Exchange rate is seen to have a positive relationship with imports and openness while also bearing a negative relationship with exchange rate and foreign reserves.

Imports bear a negative association with openness and foreign reserves. This signifies that imports will decline the more an economy is open and foreign reserves is rising. Imports and exchange rate both move in the same direction. OPN is inversely related to exchange rate. The reverse is the case between foreign reserves and exchange rate. Foreign reserves have a negative relationship with openness. The correlation analysis only shows the relationship between the pairs of variables and not the direction of causation. The direction of causation is taken care of by the pairwise Granger causality test.

Unit Root Tests

The Augmented Dickey Fuller (ADF) test for stationarity is utilized in this study to ascertain the time series characteristics of the data on the variables. Adegboye (2020), noted that the stationarity test is essential to determine the patterns of the series since the test hypothesis particularly show whether the series are stationary or not and not in reference to the possession of unit roots. The interpretation of the test outcomes is as follows: a significant ADF coefficient for a variable indicates stationarity. In other words, the null hypothesis for the test is that the data is non-stationary (there is unit root); while the alternate hypothesis for the test is that the data is stationary (the absence of unit root). The results obtained are presented in Table 3.

Table 3 Unit Root test for Variables

Variable	**ADF Test**		**Order of Integration**
	Levels	*First Difference*	
RGDP	-1.738794	-3.057036	I[1]
EXPT	-3.003745	-	I[0]
IMP	-3.316581	-	I[0]
EXRT	-6.716077	-	I[0]
OPN	-2.487161	-3.527777	I[1]
FR	-2.021179	-11.21505	I[1]

Source: Author's computation using Eviews 9

From the results of the ADF tests reported in Table 3, it can be seen that the ADF test statistics for each of the variables are reported at levels and first difference. The test statistics of the variables in levels are less than the 95 percent critical values while the test statistic values for the series in first differences are greater than the critical values at the 5 percent significance level. Thus, the variables RGDP, OPN and FR are non-stationary in levels but their first differences were found to be stationary. On the other hand, EXPT, IMP and EXRT were all stationary at levels. That is to say, the variables were integrated of mixed order: I(0) and I(1). This implies that a dynamic long run relationship may be estimated based on the ARDL approach to cointegration for the dynamic analysis. Essentially, it is appropriate to use cointegration analysis to estimate the relationships between the variables.

Cointegration Analysis

This involves testing for the existence of a cointegrating relationship between economic growth and trade sector variables. This test also helps to confirm the application of a dynamic structure for the model estimation. The evaluation of the Bounds cointegration test results shown in Table 4 is based on the critical F-statistic values for the lower and upper bounds as also reported in the results. Table 4 shows the result of the Bounds test of long run effects for the ARDL specifications for the specified equation in the study.

Table 4: Results of Bounds Approach to Cointegration Test

Sample: 1985 2021
Null Hypothesis: No long-run relationships exist
Included observations: 29

Test Statistic	Value	K
F-statistic	7.320895	5
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	1.81	2.93
5%	2.14	3.34
2.5%	2.44	3.71
1%	2.82	4.21

Source: Author's computations using Eviews 9

From the Table, the F-values for the tests are all greater than both the lower and upper Bounds values at the 5 percent levels. According to the empirical output of the F-values in both panels of Table 4 therefore, it can be seen that the null hypothesis of no long-run relationship between trade and economic growth is rejected at the 5 percent level. These results reveal that for the specified equation (model), the determinant variables had strong long run relationships with the dependent variable. Apparently, this result shows that a long run relationship exists among the variables.

Analysis of ARDL Results

In this section, the results of the estimated ARDL model for the relationships are presented and analysed. It should be noted that the dynamic from of the ARDL estimates suggests that both the long run and short run estimates are presented. The stable estimates are however based on the long run relationships.

Regression Analysis

In Table 5, both the short run (in upper panel) the long run (in the lower panel) results for the relationship between trade and economic growth are presented.

Table 5: Estimation Results for trade and economic growth

ARDL Cointegrating And Long Run Form
Dependent Variable: LOG(RGDP)
Selected Model: ARDL(1, 2, 2, 1, 0, 1)
Date: 05/29/22 Time: 19:08
Sample: 1985 2021
Included observations: 29

Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(EXPT)	0.026046	0.018457	1.411168	0.1762

DLOG(EXPT(-1))	-0.066238	0.021601	-3.066404	0.0070
DLOG(IMP)	0.016190	0.022866	0.708046	0.4885
DLOG(IMP(-1))	0.053385	0.022323	2.391513	0.0286
D(EXRT)	-0.000020	0.000123	-0.165242	0.8707
DLOG(OPN)	-0.039552	0.008161	-4.846301	0.0002
D(FR)	-0.000000	0.000000	-0.257630	0.7998
CointEq(-1)	-0.056004	0.011360	-4.929910	0.0001

Cointeq = LOG(RGDP) - (2.1895*LOG(EXPT) - 0.6391*LOG(IMP) -0.0023
*EXRT -0.7062*LOG(OPN) -0.0000*FR)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(EXPT)	2.189471	0.490949	4.459666	0.0003
LOG(IMP)	-0.639096	0.743750	-0.859289	0.4021
EXRT	-0.002287	0.001979	-1.155803	0.2637
LOG(OPN)	-0.706233	0.166791	-4.234236	0.0006
FR	-0.000000	0.000000	-1.019586	0.3222

Source: Author's computation using Eviews 9.

In the short run, export in the current period is not significant while it is significant in the previous period. This shows that the contemporaneous effect of exports does not impact economic growth in Nigeria in the short run. However, the delayed effect is negative and significant. Thus, it is seen that in the short run, EXPT has significant negative impact on economic growth in Nigeria at the 1% level. A percentage rise in export is associated with a 0.066 percent decrease in RGDP in the short run. The contemporaneous effect of import on economic growth is not statistically significant while the one period lagged effect of import on economic growth passes the significance test at the 5% level. This result shows that imports have a positive impact on economic growth in the short run. The higher the import level, the higher the economic growth in Nigeria. As such a one percent increase in import will result in a 0.053 percent increase in economic growth. The positive and significant of imports on economic growth is in consonance with the study of Humpage (2000). Imports play an important role in the investment environment and thus industrial development and economic growth.

Exchange rate does not contemporaneously impact economic growth in Nigeria as can be seen in Table 5. Suggesting that exchange rate was not key in determining economic growth within the period under review. Openness significantly impact economic growth in the short run. This suggests that trade openness tend to deteriorate economic growth in the current period. A 1% rise in rise in the degree of openness implies that economic growth in Nigeria will reduce by 0.0396 percent. Trade openness my lead to increase in income but not increase economic growth. This is in sync with the findings from the studies by Rodriguez and Rodrik (1999). Foreign reserves have no current effect on economic growth in Nigeria within the period under review. This suggests that this variable was not a major determinant of economic growth for the period.

The lower panel of the results in Table 5 shows the long run results. From the results, only the coefficients of export (EXPT) and openness (OPN) are significant and in tandem with apriori expectation in the long run. Thus exports and trade openness are key determinants of economic growth in the long run. The observed positive effect of export on economic growth corroborates evidence from Vohra (2001), Gemechu (2002) and Agbo, Agu and Eze (2018) as this is in consonance with the export-led growth hypothesis. A percentage increase in exports is associated with a 2.189 percent increase in economic growth. This underscores the relevance of exports in the economic growth of Nigeria.

Similar findings were made by Rigobon and Rodrik (2005) who opines that openness negatively impacts economic growth. They opine that trade openness my lead to increase in income but not increase economic growth in the long run. For instance, trading-related investments in the economy, boosts imports via increases in income and aggregate demand. However, the relationship between trade openness and economic growth in the long run is determined by a host of factors but predominantly by the abilities of local firms and industries to adjust and cope with the international productivity levels and their ability to develop imitative and absorptive capabilities necessary to internalize economies of scale and knowledge externalities-related trade. The scope of possible crowding out effect on local forms and industries through trade openness is given by the degree of, and the existence of, considerable differences in technologies and endowment of trading partners.

Contrary to the significant effect of import in explaining economic growth in the short run, its long term influence is not statistically significant. As such, imports do not play a formidable role in explaining economic growth in the long run of small opened economies. High import levels have the potential to adversely affect economic growth in the long run (Akosah, 2014). Just as in the short run, it is seen that EXRT and FR are not relevant in explaining economic growth in the long run.

Robustness Tests for Regression Results

Table 6 shows the stability of the cointegration parameters for the variables used in the equation.

Table 6: Post estimation test results

Test	***Value***	***Probability***
Normality test *(Jarque-Bera Statistics)*	0.163255	0. 9216
Serial Correlation *(Breush-Godfery Seria Correlation LM Test)*	1.202154	0.3279
Heteroskedasticity Test *(Breusch-Pagan-Godfrey Statistic)*	1.915513	0.1120

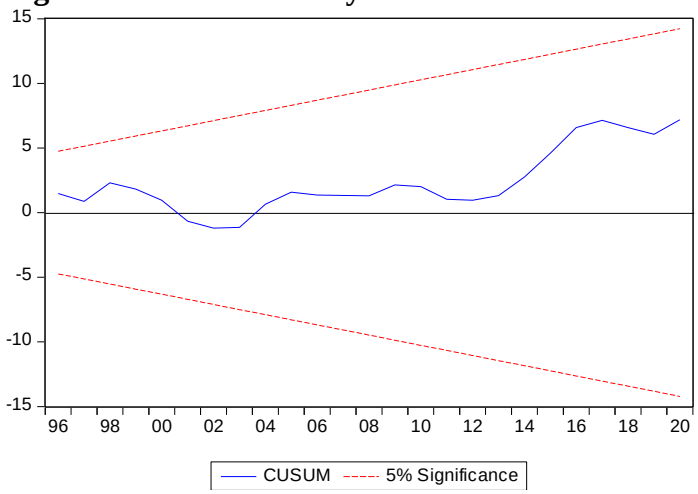
Source: Author's computation using Eviews 9

From the results, none of the J-B test for normality, LM test for serial correlation and heteroskedasticity statistics passed the significance test at the 5 percent level. Thus, the respective tests show that the residuals are normally distributed, devoid of serial

correlation and variances are the same. Thus, the estimated equation can be adjudged to be stable and effective for long term prediction and analysis.

Robustness checks are provided by testing the stability of the estimated data set across the cross sections in the sample. This helps to indicate the presence of possible outlier in the sample. The plot of cumulative sum of residuals (CUSUM) was used for the test. The result is presented in figure 1.

Fig 1: Parameter Stability Chart for Economic Growth equation



Source: Author's computation using Eviews 9

The chart in Figure 1 shows the result of the CUSUM of squares test. It can be seen that the CUSUM of squares line for the result lies entirely within the dotted 5 percent significance bound line throughout the chart. This reveals that the estimation is stable within the analysis.

Aigheyisi and Isikhuemen (2018) noted that trade surplus contributes to economic growth in a country. High levels of exports means that there is a high level of output from factories and industrial facilities, as well as a greater number of people that are being employed in order to keep these factories in operation.

The study also found that openness negatively influences economic growth in the short and long run. Similar studies was also found by Rigobon and Rodrik (2005) who opine that trade openness my lead to increase in income but not increase economic growth in the long run. For instance, trading-related investments in the economy, boosts imports via increases in income and aggregate demand. However, the relationship between trade openness and economic growth in the long run is determined by a host of factors but predominantly by the abilities of local firms and industries to adjust and cope with the international productivity levels and their ability to develop imitative and absorptive capabilities necessary to internalize economies of scale and knowledge externalities-related trade. The scope of possible crowding out effect on local forms and industries through trade openness is given by the degree of, and the existence of, considerable differences in technologies and endowment of trading partners.

The outcome of the estimation exercise also emphasised the role imports play in the growth of the economy in the short run. Imports play an important role in the investment environment and thus industrial development and economic growth. This is an area that

needs strong policy action as high level tend to negatively impact economic growth as highlighted by (Akosah, 2014).

5.0 Summary, Conclusion and Recommendations

Summary and Conclusion

This study examined the nexus between international trade and economic growth in Nigeria. The Autoregressive Distributed Lags (ARDL) technique and a host of other analytical techniques were employed in the empirical analysis for the period 1985 to 2021 to ensure robustness. A broad highlight from the study indicated that export, import and trade openness provide a background for analyzing economic growth in Nigeria. However, the long run effect of import was negative and not key in explaining economic growth.

Recommendations

Based on the findings from this study the following recommendations are made.

First, there is need to evolve policies that pursue export promotion and import substitution with all sincerity of purpose. This can be in the form of removal of restrictions on imports as well as low taxes for export processing industries. High levels of exports means that there is a high level of output from factories and industrial facilities, as well as a greater number of people that are being employed in order to keep these factories in operation.

Second, the observed significant effect of import on economic growth in the short run call on restriction or control of some categories of imports especially those which can be produced domestically. In doing this, there is need to boost the local productive capacity of the economy to enhance output and reduce dependence on imports. This can be achieved by creating the right macroeconomic, social and political environment for productive activities to thrive in.

Essentially, trade openness measures deepen our understanding on how trade volumes affect growth performance on one side and how effective has been trade liberalization policy in enhancing growth performance. The results of our empirical investigation provide robust evidence that trade intensity measures are negatively associated with economic growth. For instance, trading-related investments in the economy, boosts imports via increases in income and aggregate demand. This suggests the need for policy dimensions for adequately adjust trade openness to efficient levels. As such, exports should be promoted along-side imports of technology to aid production rather than consumables.

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WEALTH AND RETIREMENT HAPPINESS: A STUDY OF RETIREES IN BAYELSA STATE, NIGERIA

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Abstract

There is an increasing worry globally about the plight of retirees, especially in African *countries where retirement is considered a monster. The study examines the relationship between wealth accumulation and happiness of retirees in Bayelsa state, using a sample of 338 public sector retirees. Wealth accumulation was disaggregated into money (financial wealth) and status (social wealth). The Logit and the Probit regression were employed in analyzing the data. It was found that financial wealth (money) and social wealth (status) had a positive and significant impact on retiree happiness. It was also found that financial (money) wealth and social (status) wealth had a complementary effect on retiree happiness. The result also showed that early or timely payment of retiree benefits and the level at retirement had a significant impact on retiree happiness. Full implementation of minimum wages and timely payment of allowances and other welfare packages, including annual leave benefits due workers are needed to ensure that workers accumulate more money before retirement. This requires efficient fiscal planning (including the enhancement of links between the processes of wage determination, and fiscal frameworks) to ensure appropriate and adequate financing of wage bills, and the flexibility to adjust promotion to the rightful levels for staff that are due for it. Early or timely payment of retirees' gratuities benefits is also recommended for retirees' happiness after retirement.*

Keywords: Retirees, Retirees happiness, Wealth, Bayelsa state.

JEL Codes: C22, C32, H81

1.0 Introduction

Happiness is one desirable commodity of life of every creature, particularly, human beings. What, however, constitutes happiness of an individual differs from person to person. Could humans be happier on wealth accumulation at retirement? Though retirement policy differs from country to country. Some countries retirement age is 65 years, while others are either less or above. Interestingly and more worrisome is the manner with which retirement has become public discourse and concern in recent times. Questions have been raised especially as to what happens at retirement. Fundamentally,

questions that are often asked are; are retirees happier and satisfied at retirement? What makes a retiree happier and satisfied?

Economic well-being at retirement has been of increasing interest for economic researchers. It has become a critical issue of concern to both the working age and dependents. Thus, understanding the factors that determine socio-economic well-being shall assist policy makers to formulate, evaluate and implement retirement programmes and policies.

What constitutes happiness to retirees have been a big question unanswered. While individual preferences differ as to what makes a retiree happier, happiness at retirement could be a function of several factors, including wealth. Wealth is not restricted to just money, but consists of many other components such as health, social status, finances, and time. These could be broken down into two categories which are: Money (Financial Wealth) and Status (Social Wealth). What constitutes happiness to retirees amongst these factors depends on individual preference.

Bayelsa State has eight (8) local government areas. These local government areas have Seven Thousand and Fifty-Six (7,056) total population of pensioners as at June 2021. It is a composition of mainstream, head of services/permanent secretaries and post primary schools pensioners. The 7,056 pensioners are made up of: Brass LGA - 398; Ekeremor LGA – 446; Kolokuma/Opokuma LGA – 809; Nembe LGA – 659; Ogbia LGA – 1201; Sagbama LGA – 752; Southern Ijaw LGA – 1489; and Yenagoa LGA – 1302 respectively.

Statement of the Problem

Employees are more concerned about having enough money and wealth at retirement than good health as research reveals.

Almost three-quarters (70%) of employees say that being financially secure would make them happy in retirement, according to a report from the National Association of Pension Funds (NAPF, 2010). Financial security was voted above all other essential ingredients for happiness in retirement, including good health (69%), being able to travel (48%) and being surrounded by family and friends (45%). NAPF chief executive, Joanne Segar in 2010, said "In the retirement happiness stakes, wealth edges ahead of health because it lays the foundation for future life after work". While this area of research is pertinent, focusing on economic well-being of retirees may likely miss out other important factors that could determine the welfare and happiness of retirees in Nigeria and Bayelsa State in particular. What factor of wealth makes a retiree in Bayelsa State happier is a million naira question that has not been answered. There is a lack of a scientific study of wealth and retirement happiness. This study, therefore, seeks to examine the relationship between wealth accumulation and happiness of retirees in Bayelsa State, with specific objectives to: (1) examine the relationship between financial wealth and retirement happiness in Bayelsa State; and (2) assess the relationship between social wealth and retirement happiness in Bayelsa State.

2.0 Literature Review

Theoretical framework

This study hinges on the Good Life theory as it relates closely to this work.

The Good Life: Desire Theory

Desire theory holds that a happy person is one who gets what they want. It places the judgment of happiness on the one doing the wanting, because while your neighbour may want a nicer car or new boyfriend/girlfriend and view those things as a road to happiness, you may be wanting anything from a day off and a chocolate shake to a better job and a new boyfriend/girlfriend.

This theory is considered better than Hedonism. It holds that happiness is a matter of getting what you want with the content of the want left to the person who does the wanting. James Griffin in 1986 while proffering answers to questions raised from utilitarianism views of the social good as some kind of aggregate of individual well-being. Griffin's answer provided two outcomes. One answer attaches value to pleasurable states of mind, the other to the fulfillment of desire. Griffin favours desire-fulfillment, arguing that we can and do desire things that we can never experience.
While Hedonism holds that the preponderance of pleasure over pain is the recipe for happiness even if this is not what one desires most. However, Desire theory holds that that fulfillment of a desire contributes to one's happiness, regardless of the amount of pleasure (displeasure).

Empirical Literature

Thuku (2013) assessed how pre-retirement preparation influences retirement happiness in Kenya, with a view to making appropriate recommendations to improve the quality of life during retirement. The study was conducted in Nyeri County, Kenya using randomly selected retirees. Data was collected using questionnaire and analyzed using the Statistical Package for Social Sciences (SPSS). The study found that; age, gender, marital status, parents' socioeconomic status, availability of retirement information, monthly income, retirement planning and the availability of reliable social support systems significantly influenced retirement happiness. The study recommended that all employees be provided with retirement planning information and counseling on how to cope with post-retirement social, physiological and financial challenges. This study is appreciated, however, it is different from our study in many dimensions. One, the variables used, the location of study and the period of study. Our study was conducted in Bayelsa State, Nigeria and focused on four variables such as; financial wealth, social wealth, physical wealth and freedom wealth on retirement happiness of retirees in Bayelsa State.

Calvo, Haverstick and Sass (2009) explored the factors that affect an individual's happiness while transitioning into retirement. Using longitudinal data from the Health and Retirement Study, the study explored what shapes the change in happiness between the last wave of full employment and the first wave of full retirement. Results suggest that what matters is not the type of transition (gradual retirement or cold turkey), but whether people perceive the transition as chosen or forced. Again we have benefitted from the study, however, it has a divergent perspective from our study that concentrated

on four variables that attracts happiness at ones retirement life which includes; financial wealth, social wealth, physical wealth and freedom wealth on retirement happiness.
Kesavayuth, Rosenman and Zikos(2016) investigated how two sources of individual heterogeneity—personality and gender—impact the well-being effects of retirement. Using data on older men and women from the British Household Panel Survey and its continuation, Understanding Society. They estimated the causal effect of retirement on satisfaction with overall life and domains of life in the presence of personality characteristics. They found that retirement increases leisure satisfaction of both males and females but not necessarily life satisfaction and income satisfaction. They further showed that certain personality characteristics affect the well-being of female retirees, while for males, personality does not seem to matter in how they cope with retirement. This study is also different from our work in terms of choices of variables used and direction of the study.

3.0 Methodology

3.1 The Study Area

The population of the study is retirees in Bayelsa State. It comprises retirees in ministries, departments, agencies and other government-owned institutions across the state. As of the time of carrying out the study, the population of retirees (pensioners) was 7,056 in Bayelsa State Pension Board in 2021.

3.3 Sample and Sampling Technique

A sample of 400 retirees were selected for the study. 50 retirees were randomly selected from each of the eight local government areas in the state, therefore, making a total sample of 400 respondents. A structured questionnaire was used as the instrument for data collection. The designed instrument includes multiple-choice closed- and open-ended questions.

3.4 Model Specification

The Logit Regression model was employed to analyze objectives one and two, which are to examine the effect of financial wealth and social (status) wealth respectively on retirement happiness. The functional form of the model is presented as follows:

$$Logit(Rethapines_i) = h(Finwealth, Socwealth, Retbenifit, Marstatus, Gender, Age, Level) \quad (1)$$

where $Rethapines_i$ is the likelihood of a retiree in the i[th] household being happy at retirement, and $p_i/(1 - Rethapines_i)$ is the odds ratio (OR) for a retiree being happy at retirement. $Finwealth$ is the financial wealth of a retiree and $Socwealth$ is the social (status) wealth of a retiree. $Retbenifit$ represents the payment of retirement benefits, $Retage$ is the age at retirement, $Marstatus$ represents the marital status of a retiree, $Gender$ is the gender of a retiree in the i[th] household and level is the level at retirement. $Finwealth, Socwealth, Retbenifit, Marstatus$ and Level are expected to have a direct relationship with $Rethapines$, while $Gender$ and $Retage$ could have a direct or inverse relationship with the dependent variable.
In other to capture the complementarity or otherwise of financial and social (status) wealth – that is, if financial wealth and social (status) wealth have complementary

(substitution) effects on the retirement happiness of retirees, we interact the financial wealth and social (status) wealth and re-specify equation (1) as:

$$Logit(Rethapines_i) = \varphi_0 + \varphi_1 Finwealth + \varphi_2 Socwealth + \varphi_3 Finwealth * Socwealth + \varphi_4 Retbenifit + \varphi_5 Marstatus + \varphi_6 Gender + \varphi_7 Retage + \varphi_8 Level + e_{1i} \quad (2)$$

Where $Finwealth * Socwealth$ is the interaction term of financial wealth and social (status) wealth, while e_{1i} represents the error term. Other variables remained as defined earlier.

The signs and significance of the interaction variable coefficient will determine if financial wealth and social (status) wealth are complementarity or substitutes. If the coefficient for financial wealth is positive, for example, and the coefficient for the interaction term is negative, then, it means that financial wealth and social (status) wealth have a substitution effect on retirement happiness. On the contrary, if the coefficient for financial wealth is negative and the interaction term is positive or if both are positive, then, it implies that financial wealth and social (status) wealth have a complementary effect on retirement happiness.

A Probit Regression model was estimated to perform a robustness check of the estimates. The Probit Regression model is as follows:

$$Probit(Rethapines_i) = \beta_0 + \beta_1 Finwealth + \beta_2 Socwealth + \beta_3 Finwealth * Socwealth + \beta_4 Retbenifit + \beta_5 Marstatus + \beta_6 Gender + \beta_7 Retage + \beta_8 Level + e_{2i} \quad (3)$$

Where $Prob(Rethapines_i)$ is the probability of a retiree in the i[th] household being happy at retirement. β_i $(i = 1, 2, 3, \ldots, 8)$ are the regression parameters to be estimated, while e_{2i} represents the error term. The variables are the same as in equation (2) above.

The logit models would be estimated using the covariance-formula estimator. It is based on the maximum likelihood theory. This Estimation Technique is efficient and appropriate as long as the distribution of retirement happiness can be approximated, using a theoretical model such as a density function $f(x, \theta)$. An advantage of the Maximum likelihood estimators is that it is mostly asymptotically unbiased and normally distributed with variances as provided by the Cramer-Rao bound (Jędrzejczak & Kubacki, 2013). On the other hand, the Probit models will be estimated, using the quasi-maximum likelihood estimator (QLME) introduced by Papke & Wooldridge (2008). The estimator is based on the assumption of a normal distribution of the errors and is also considered to be homoscedastic and may otherwise be inconsistent.

4.0 Presentation of Results and Discussion

4.1 Demographic Characteristics of the Respondents

A total of 400 questionnaires were distributed but 338 were retrieved and recorded and analyzed. We begin the analysis with the demographic characteristics of the respondents. Table 1 reports the demographic characteristics of the respondents.

Table 1: Descriptive profiles of the respondents

	Frequency	%
Area of residence		
Rural	123	36.39
Semi-rural	169	50.00
Urban	46	13.61
Total	**338**	**100.00**
Gender		
Male	236	69.82
Female	102	30.18
Total	**338**	**100.00**
Age		
Below 30 years	1	0.30
40 to 49 years	5	1.48
50 to 59 years	21	6.21
60 to 69 years	133	39.35
70 years and above	178	52.66
Total	**338**	**100.00**
Marital status		
Single	5	1.48
Married	235	69.53
Divorced	55	16.27
Widowed	43	12.72
Total	**338**	**100.00**

Source: Author's computation

123 or 36.39% of the respondents reside in rural areas, and 169 or 50% of the respondents reside in semi-rural areas. Those whose areas of residence are urban are 46, representing 13.61% of the total respondents. Therefore, the majority of the respondents reside in semi-rural areas. As regard the gender of the respondents, 236 or 69.82% are males, while 102 or 30.18% are females. This indicates that the majority of the respondents were males. Of the age respondents, 1 or 0.30% respondents were between the ages of 30 to 39 years, while those between the ages of 40 to 49 years were 5 or 1.48%. 21 or 6.21% of the respondents were between the ages of 50 to 59 years, and those between 60 to 69 years were 133 or 39.35%. Those who are 70 years and above are 178, representing 52.66% of the total respondents. This means the majority of the respondents are above the age of 70 years and above. 5 or 1.48% of the respondents were single, while 235 or 69.53% were married. Those who were divorced were 55 or 16.27%, and 43 or 12.72% of the respondents were widowed. This also means that majority of the respondents were married at the time of carrying out this study.

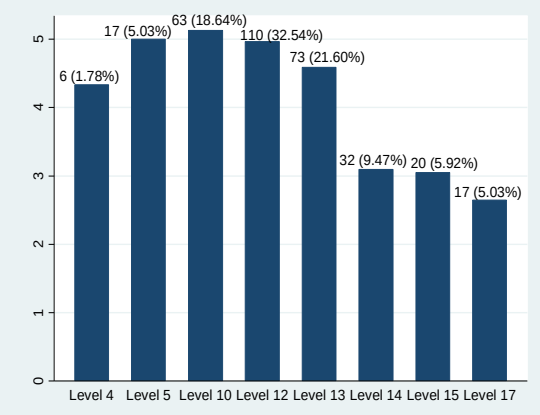
Other characteristics of the respondents were also examined and presented in Figure 1. The analysis showed that 6 or 1.78% of the retirees retired at level 4, 17 or 5.03% of the retirees retired at level 5, while 63 or 18.64% of the retirees retired at level 10. Those

who retired at level 12 are 110 or 32.54%, and 73 or 21.60% of the retirees retired at level 13. Also, 32 retirees or 9.47% of the retirees retried at level 14, 20 of the retirees or 5.92% of the retirees retired at level 15, while those who retired at level 17 were 17 or 5.03% of the total respondents. Thus, based on the respondents' level at retirement, the majority of the retirees retired at level 12.

For the category of retirees, 63.91 of the sampled retirees were in the mainstream, while those that were in the primary sector were 31.95%. The retirees who were HOS/permanent secretaries were 4.14% of the total respondents. This reveals that the majority of the retirees were in the mainstream.

Figure 1(a): Other characteristics of the respondents

(a) Level at retirement



(b) category of retiree

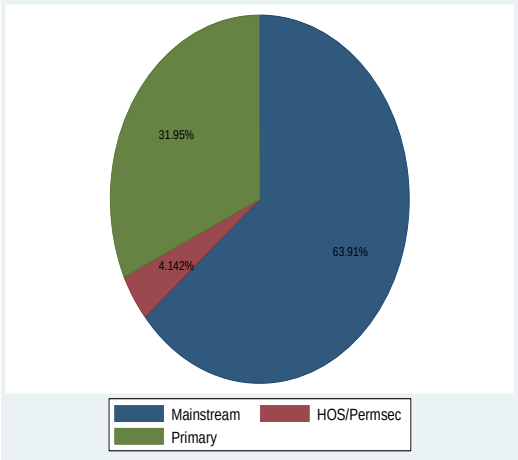
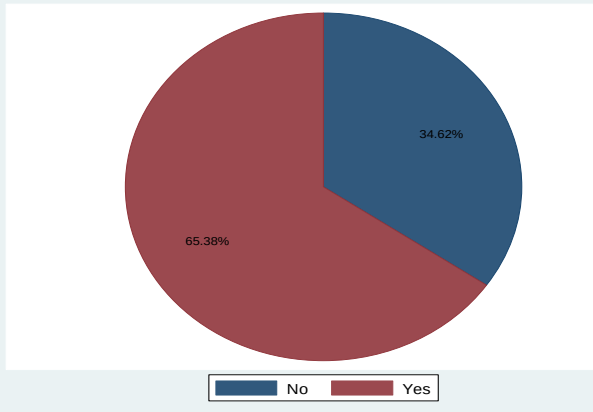
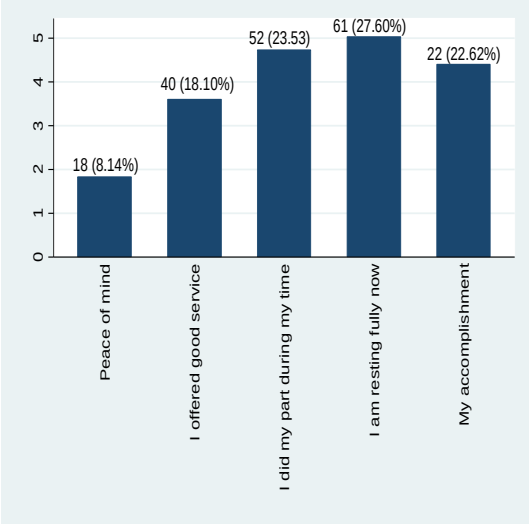


Figure 1(b): Other characteristics of the respondents

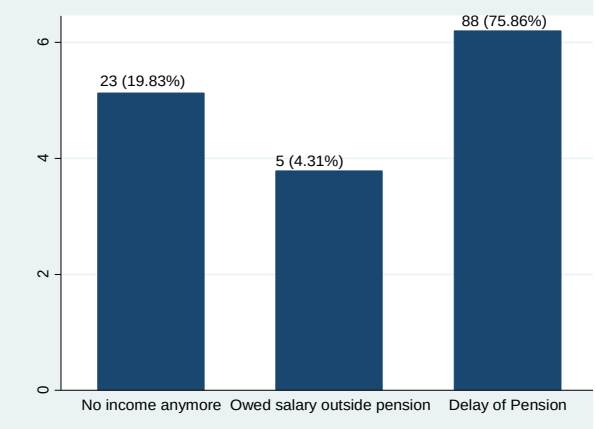
(c) Happy as a retiree?



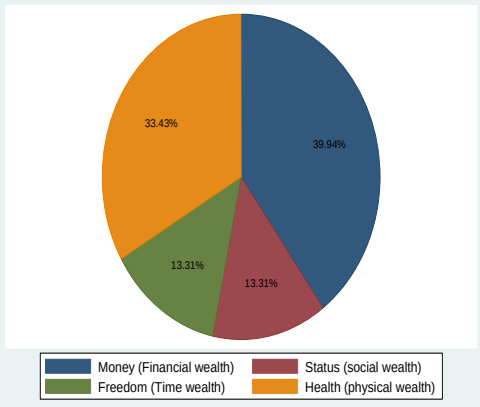
(d) Reasons for being happy



(e) Reasons for not being happy



(f) What it means to be wealthy (most preferred wealth)



Source: Plot by the author

Concerning the happiness of the retirees, the analysis shows that 65.38% of the respondents were happy as retirees, while 34.62% of the retirees were not happy. This is an indication that the majority of the retirees were happy as retirees.

An examination of the reasons for being happy for those that were happy as retirees showed that 18 or 8.14% were happy because of peace of mind, while 40 or 18.10% of the retirees said that they were happy because they offered good services at their time of service. Those who said they were happy because they did their part during their time at service were 62, representing 23.53% of the total respondents. 61 or 27.60% of the retirees said that they were happy because they are resting fully now, while 22 or 22.62% of the retirees were happy because of their accomplishments. This means that majority of the retirees were happy because they are resting fully now.

For those who were not happy as retirees, 23 or 19.83% said they were not happy because there is no income anymore, while 5 retirees, representing 4.31% of the total respondents said they were not happy because they were owed salaries outside the pension. For retirees who said that they were not happy because of delay in payment of pension were 88 or 75.86%. This showed that most of the retirees who were not happy as retired were because of delay in payment of pension gratuity.

Concerning the views of retirees on what it means to be wealthy, it was found that 33.43% of the retirees see wealth as health (physical wealth), while 39.94% of the retirees viewed wealth as money (financial wealth). Retirees who defined wealth from the perspective of freedom (time wealth) were 13.31%, and those who viewed wealth from the perspective of status (social wealth) were also 13.31%. This means that the majority of retirees viewed wealth from the perspective of money (financial wealth).

4.2 Impact of Money (Financial Wealth) and Status (Social Wealth) on Retiree Happiness

The impact of money (financial wealth) and status (social wealth) on retiree happiness was examined, using the Logistic Regression model. Also, for the robustness of findings,

a Probit model was estimated. Table 4.2 reports the regression estimates. Column (1) reports the odds ratios of the logistic regression with the z-values and p-values in parenthesis. Column (2), on the other hand, reports the coefficients of the Probit regression with the z-values and p-values in parenthesis.

Table 4.2: Estimates of the impact of financial (money) and social (status) wealth on retiree happiness in Bayelsa state

Retiree Happiness	(1) **Logistic Regression**	(2) **Probit Regression**
Financial Wealth	0.9970 (z = 4.01) (p = 0.000)	0.0274 (z = 3.10) (p = 0.000)
Social Wealth	0.8273 (z = 2.76) (p = 0.002)	0.1127 (z = 2.74) (p = 0.003)
Payment of retirement benefits	0.5933 (z = 2.06) (p = 0.039)	0.3265 (z = 2.09) (p = 0.036)
Financial Wealth* Social Wealth	0.7754 (z = 2.81) (p = 0.000)	0.1592 (z = 2.83) (p = 0.000)
Marital Status	0.9152 (z = 2.53) (p = 0.006)	0.0540 (z = 2.54) (p = 0.005)
Gender	1.0944 (z = 0.35) (p = 0.729)	0.0571 (z = 0.36) (p = 0.719)
Age at retirement	0.6081 (z = 4.53) (p = 0.000)	0.3241 (z = 4.62) (p = 0.000)
Level at retirement	1.1629 (z = 2.89) (p = 0.000)	0.0927 (z = 2.83) (p = 0.000)
Constant	2.2486 (z = 1.21) (p = 0.228)	0.5148 (z = 2.26) (p = 0.044)
	Logistic Regression	**Probit regression**
Pseudo R2	0.6256	0.0262
LR chi2(11)	21.17	11.41
Prob > chi2	0.000	0.1793
_hat	-0.83 (z = -0.94) (p = 0.346)	-0.86 (p = -1.00) (p = 0.316)
_hatsq	1.56 (z = 1.17) (p = 0.430)	2.51 (p = 2.27) (p = 0.023)
Probit model goodness-of-fit test		
Pearson chi2(2301)	194.24 (p = 0.3243)	194.34 (p = 0.3225)

Source: Author's computation

Financial wealth (money) shows a positive and significant coefficient of 0.9970 in column (1). This means that an increase in financial wealth brings about a 1.00% increase in retiree happiness. In addition, in column (2), the results show positive coefficient of 0.0274 with z-value and p-value of 3.10 and 0.000, therefore, confirming the results in column (1).

Social wealth (status) also shows a positive coefficient of 0.8273 with a significant z-value and p-value of 2.76 and 0.002 in column (1). Thus, any additional social wealth (status) acquired results in a significant increase in retiree happiness. A similar result also showed up in column (2). Social wealth has a 0.11% positive and significant impact on retiree happiness.

The interaction coefficient of financial wealth and social wealth is 0.7754 with a z-value of 2.81 and a p-value of 0.000 in column (1). Since the coefficients for both financial wealth and the interaction term are positive, then, financial wealth and social (status) wealth have a complementary effect on retirement happiness. Financial wealth and social wealth jointly lead to a 0.78% additional significant increase in retiree happiness in column (1). The results in column (2) is similar to column (1), therefore, supporting the results in column (1).

The coefficient for payment of retirement benefits is 0.5933 in column (1) with a significant z-value and p-value. This means that early or timely payment of retiree benefits brings about 0.59% additional happiness at the retirement of retirees. The result is similar in column (2), also showing the positive and significant impact of payment of retirement benefits on retiree happiness.

Both in columns (1) and (2), the coefficient of marital status is positive and significant. This means that marital status has a positive and significant impact on retiree happiness in columns (1) and (2).

Gender shows coefficient of 1.0944 with an insignificant z-value of 0.35 in column (1). Also, in column (2), the coefficient of gender is positive (0.0571) with a z-value of 0.36. This means that the gender of the retiree has a positive and insignificant impact on retiree happiness.

Similarly, age at retirement shows a coefficient of 0.6081 with a z-value of 4.53 in column (1). A similar result also showed up in column (2) with a positive coefficient of 0.3245 and a z-value of 4.62. Therefore, any additional year at the retirement age leads to 0.61% additional happiness for the retirement of retirees.

Furthermore, the level at retirement shows a coefficient of 1.1629 with a z-value of 2.89 in column (1). It means the level at retirement has a positive and significant impact on retiree happiness. The coefficient is also positive and significant in column (2), therefore, supporting the result in column (1).

The Pseudo R^2 shown in column (1) indicates that the variables in the model account for about a 62.56% change in retiree happiness. The likelihood chi-square value of 21.17 ($p = 0.000$) points out that the variables jointly significantly affect retiree happiness. Also, the p-value for hatsq is 0.430. The non-significant hatsq means good regression model adequacy. Also, the insignificant Hosmer-Lemeshow goodness of fit test confirms the overall goodness of fit of the regression model. The test results in column (1) are similar to column (2).

4.3 Policy Implications of the Findings

The findings that financial wealth (money) had a positive and significant impact on retiree happiness means that workers who acquire financial wealth (accumulate or have enough money) during their active service years are happy at retirement. They are happy as retirees. Similarly, the finding that social wealth (status) has a positive and significant impact on retiree happiness implies that social wealth (status) such as respect from the community after retirement, as well as a good name at retirement, contributes significantly to the happiness of retirees at retirement. The finding that financial wealth and social (status) wealth have a complementary effect on retirement happiness means that financial wealth and social (status) wealth jointly increase the happiness of retirees at retirement. With the achievement of the two, retirees could be happier in retirement.

It was also found that early or timely payment of retiree benefits (gratuities) and the level of retirement had a significant impact on retiree happiness. This finding implies that at retirement, retirees are happy when retiree benefits are paid early or timely and if they are given the rightful level at work (the due promotion before retirement). In this regard, our finding implies that retirees who stay longer in service before retirement are happier. In other words, longer service years contribute meaningfully to their happiness at retirement.

5. Summary, Conclusion and Recommendations

The study examined the relationship between wealth accumulation and the happiness of retirees in Bayelsa state. Based on the findings, the study concludes that wealth accumulation significantly determined the happiness of retirees in Bayelsa state. Financial wealth and social wealth positively and significantly affect the retirement happiness of retirees in Bayelsa state. Financial wealth and social (status) wealth jointly increase the happiness of retirees at retirement. Other variables such as early or timely payment of retiree benefits (gratuities), the level at retirement, and the age at which retirees retire from active service also play a significant role in the happiness of retirees in Bayelsa state.

Full implementation of minimum wages and timely payment of allowances and other welfare packages, including health and annual leave benefits due workers are needed to ensure that workers accumulate more money before retirement. This requires efficient fiscal planning to ensure appropriate and adequate financing of the wage bill, and the flexibility to adjust promotion to the rightful levels for staff that are due. These would complement financial wealth (money) to promote happiness in retirement. Early or timely payment of retiree benefits (gratuities), as well as an increase in the retirement age from 65 years to 70 years across all levels of workers in every category of work is also recommended for retiree happiness after retirement.

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